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AMBIENT AIR MONITORING PROGRAM
MUGGAH CREEK REMEDIATION PROJECT
MAY 2002 SAMPLING EVENTS

FINAL REPORT

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MUGGAH CREEK REMEDIATION PROJECT
MAY 2002 SAMPLING EVENTS

FINAL REPORT

SUBMITTED TO:

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TV21233
August 2002

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1.0 INTRODUCTION

This report provides a summary and interpretation of the Muggah Creek Remediation Project Ambient Air Monitoring Program results for the month of May 2002.

In the fall of 2001, an expanded ambient air monitoring program (AAMP) was developed and implemented for the Sydney Muggah Creek Remediation Project. The AAMP is designed to monitor air quality within the Sydney airshed both prior to (background) and during the proposed remedial activities to be performed on the Sydney Tar Ponds and Coke Ovens site. The monitoring is being performed to determine whether there are any long-term and/or short-term effects on human health and the environment from the proposed remedial activities, and also to assess impacts to the airshed from the Sydney Tar Ponds and Coke Ovens site during periods of inactivity.

The expanded program consists of the sampling of ambient air for particulate matter less than 10 microns in diameter (3 fixed locations), particulate matter less than 2.5 microns in diameter (3 fixed locations), metal parameters, polyaromatic hydrocarbon parameters, and volatile organic compound parameters at six fixed locations throughout Sydney. In addition, a mobile station is available to be used at various locations, depending on the location of remedial activities.

During remedial activities, additional short-term monitoring was performed onsite in the areas of immediate activity as directed by the Project Management Consultant (PMC). Remedial activities on the Coke Ovens site included the removal of the Cooling Grids over a two-day period on May 28th and 29th. AMEC performed short-term monitoring for particulate matter less than 10 microns in diameter and volatile organic compounds during this activity.

This report summarizes air monitoring results for three sampling events performed on May 2nd, 14th and 28th, 2002, as part of the AAMP, and for short-term monitoring during removal of the Cooling Grids. The mobile station was not used during the above-mentioned events.

2.0 PROGRAM DESCRIPTION

The expanded program consists of sampling for particulate matter less than 10 microns (PM_{10}) and metals at 3 fixed locations, particulate matter less than 2.5 microns ($PM_{2.5}$) and metals at 3 other fixed locations, polyaromatic hydrocarbons (PAHs) and volatile organic compounds (VOCs) at six fixed locations throughout Sydney. In addition, a mobile station can be used at various locations, depending on the area in which remedial activities will be performed. Table 1 provides a summary of the fixed sampling locations and parameters to be sampled at each location including the mobile station.

TABLE 1
Summary of Sampling Locations and Parameters Analyzed

Parameter	Victoria Road STATION 1	Frederick Street STATION 2	Henry Street STATION 3	Kings Road STATION 4	Intercolonial Street STATION 5	DesBarres Street STATION 6	Mobile Station STATION 7
$PM_{2.5}$			•	•	•		•
PM_{10}	•	•				•	•
PAH	•	•	•	•	•	•	•
VOC	•	•	•	•	•	•	•
Metals	•	•	•	•	•	•	•

Refer to Figure 1 for the sampling locations. The sampling frequency for the program follows a 6-day National Air Pollution Surveillance (NAPS) schedule during periods when activity is occurring at the Tar Ponds and/or Coke Ovens site. The sampling during periods of non-activity will be performed on a 12-day schedule falling on NAPS days. The sampling duration for each event is 24-hours (midnight to midnight).

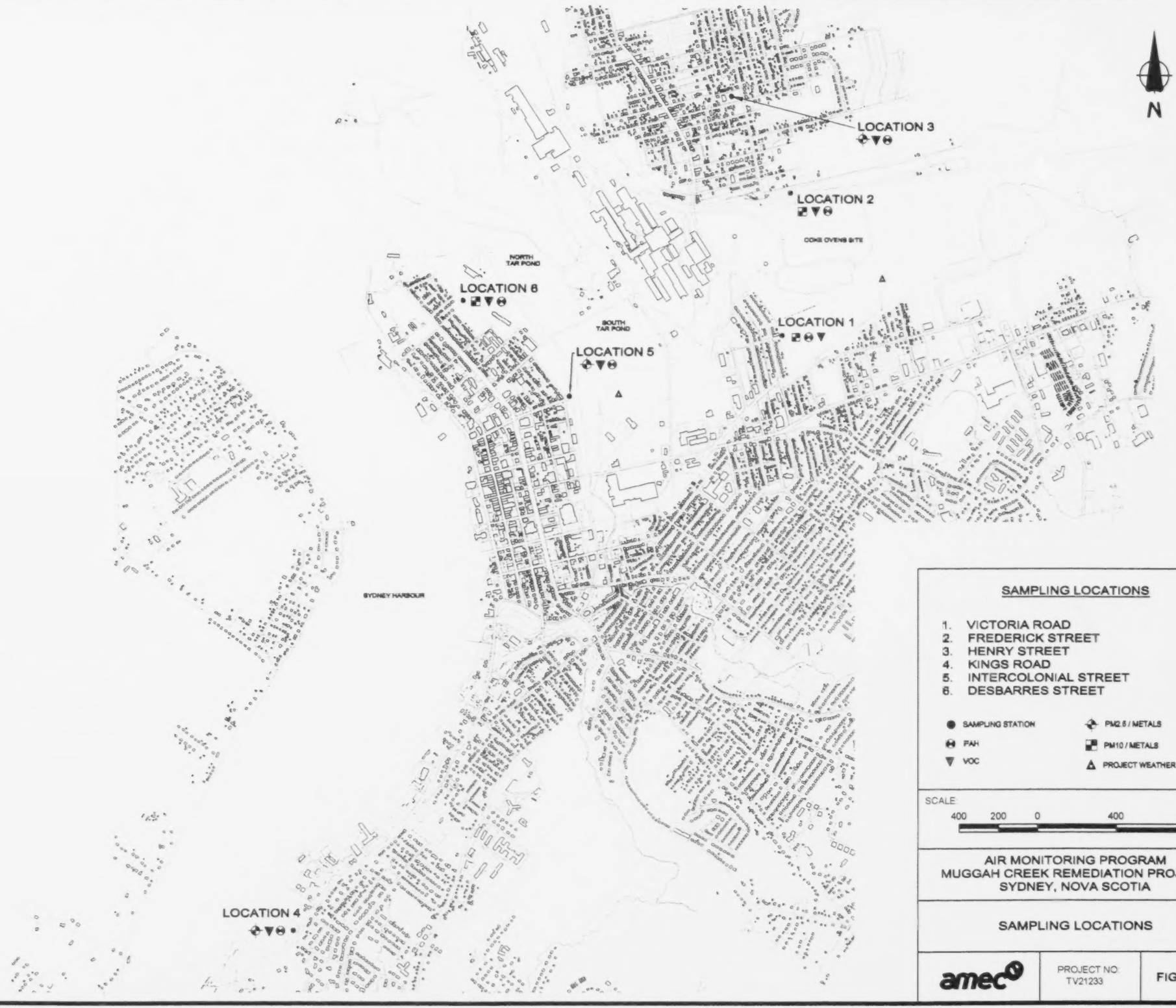
Sampling falling on NAPS days was performed on May 2nd and 14th. A sampling event that was originally scheduled for the NAPS day falling on the 26th was moved to the 28th, in order to obtain a sample event during the removal of the Cooling Grids. The mobile station was not used during the month of May.

Short-term monitoring activities were performed on May 28th and 29th for PM_{10} and VOCs during the removal of the Cooling Grids. Short-term monitoring included the use of a portable hand held instrument to obtain measurements at the Coke Ovens site fenceline during each workday (typically 7:00 am to 7:00 pm).

Weather information for the program during the month of May was obtained from the two project weather stations, one located at the former Public Information Display Centre (PIDC) site off Terminal Road and the other at the southeast end of the Coke Ovens site.

2.1 SUMMARY OF METHODS AND EQUIPMENT

The field program consisted of sampling for PM_{10}, PAHs, and metals using high volume sampling equipment, $PM_{2.5}$ and metals using low volume sampling equipment and sampling for VOCs using stainless steel evacuated canisters. The following provides a summary of methods, parameters analyzed and equipment employed. Refer to Appendix "A" for a sketch of each piece of equipment and a description of sampling procedures.



SAMPLING LOCATIONS

1. VICTORIA ROAD
2. FREDERICK STREET
3. HENRY STREET
4. KINGS ROAD
5. INTERCOLONIAL STREET
6. DESBARRES STREET

- SAMPLING STATION
- PAH
- VOC
- PM2.5 / METALS
- PM10 / METALS
- PROJECT WEATHER STATIONS

SCALE:
400 200 0 400 800m

AIR MONITORING PROGRAM
MUGGAH CREEK REMEDIATION PROJECT
SYDNEY, NOVA SCOTIA

SAMPLING LOCATIONS

amec | PROJECT NO: TV21233 | FIGURE 1

2.1.1 $PM_{2.5}$ and Metals

Sampling for $PM_{2.5}$ was conducted in accordance with the United States Environmental Protection Agency (USEPA) Reference Method for the Determination of Fine Particulate Matter as $PM_{2.5}$ in the Atmosphere (40 CFR, Subchapter C, Part 50, Appendix L). Sampling was performed with the BGI PQ-200 $PM_{2.5}$ sampling system. The media used to capture $PM_{2.5}$ and metals were 47 mm polytetrafluoroethylene (PTFE) Teflon filters. Analyses were performed at the Environmental Services Laboratory (ESL) in Sydney. Refer to Table 2 for a list of metals parameters and $PM_{2.5}$ analyzed.

TABLE 2
Summary of $PM_{2.5}$ and Metals Parameters Analyzed

$PM_{2.5}$	Beryllium	Cobalt	Lead	Nickel	Tin	Strontium	Arsenic
Aluminum	Boron	Calcium	Lithium	Silver	Uranium	Magnesium	Selenium
Antimony	Cadmium	Copper	Manganese	Sodium	Vanadium	Potassium	Mercury (1)
Barium	Chromium	Iron	Molybdenum	Thallium	Zinc	Sulfur	

Note: (1) Mercury is analyzed as only the particulate fraction.

2.1.2 PM_{10} and Metals

Sampling for PM_{10} was performed in accordance with the USEPA Reference Method for the Determination of Particulate Matter as PM_{10} in the Atmosphere (40 CFR, Part 50, Appendix M). All sampling was performed with either Graesby Anderson or Tisch High Volume samplers. Initial and final flow checks were performed during the 24-hour sampling period. The medium used to capture PM_{10} and metals was a quartz filter. Analyses were performed by ESL. Refer to Table 3 for a list of metals parameters and PM_{10} analyzed.

TABLE 3
Summary of PM_{10} and Metals Parameters Analyzed

PM_{10}	Beryllium	Cobalt	Lead	Nickel	Tin	Strontium	Arsenic
Aluminum	Boron	Calcium	Lithium	Silver	Uranium	Magnesium	Selenium
Antimony	Cadmium	Copper	Manganese	Sodium	Vanadium	Potassium	Mercury (1)
Barium	Chromium	Iron	Molybdenum	Thallium	Zinc	Sulfur	

Note: (1) Mercury is analyzed as only the particulate fraction.

2.1.3 PAHs

PAH compounds were sampled in accordance with the USEPA TO13A Method. The USEPA TO13A Method samples for both the vapour/aerosol and particulate forms of PAHs. All sampling was performed with either Graesby Anderson or Tisch High Volume samplers. Initial and final flow checks were performed on each sampler during the 24-hour sampling period. The medium used to capture PAH compounds was a glass-fibre filter with a polyurethane foam (PUF) sorbent backup. ESL performed sample media preparation and analyses. Refer to Table 4 for a list of PAH parameters analyzed.

TABLE 4
Summary of PAH Parameters Analyzed

Naphthalene	Fluorene	Fluoranthene	Chrysene	Indeno(1,2,3-cd)pyrene
Acenaphthylene	Phenanthrene	Pyrene	Benzo Fluoranthene	Dibenz(a,h)anthracene
Acenaphthene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(g,h,i)perylene

2.1.4 VOCs

Sampling for VOCs was performed in accordance with the USEPA TO14A Method. An evacuated stainless steel canister is used to collect a sub-atmospheric (pressure) sample. A flow restrictive device (cantroller) was employed to acquire the samples over a 24-hour period. The evacuated canisters were transported to the Philip Service Corporation (PSC) analytical laboratory in Burlington, Ontario for analyses. Refer to Table 5 for the list of VOCs analyzed.

TABLE 5
Summary of VOC Parameters Analyzed

Dichlorodifluoromethane	Chloroform	1,1,1-Trichloroethane	Carbon tetrachloride	1,3-Dichlorobenzene
Chloromethane	1,1-Dichloroethene	1,1,2-Trichloroethane	Ethylene dibromide	1,4-Dichlorobenzene
Halocarbon 114	cis-1,3-Dichloroethene	Toluene	Ethylbenzene	1,2-Dichlorobenzene
Vinyl chloride	1,1-Dichloroethane	Benzene	m&p-Xylene	1,2,4-Trichlorobenzene
Chloroethane	1,2-Dichloropropane	cis-1,3-Dichloropropene	o-Xylene	Hexachlorobutadiene
1,2-Dichloroethane	Dichloromethane	trans-1,3-Dichloropropene	1,3,5-Trimethylbenzene	Chlorobenzene
Bromomethane	1,1,2,2-Tetrachloroethane	Trichloroethene	1,2,4-Trimethylbenzene	
Trichlorofluoromethane	Styrene	Tetrachloroethene	Halocarbon 113	

2.2 QA/QC SAMPLING

The May 2nd QA/QC sampling consisted of obtaining field duplicates for PM_{10} and metals at the Victoria Road location, $PM_{2.5}$ and metals at the Intercolonial Street location and VOCs at the DesBarres Street location. The duplicate VOC samples were sent to PSC for analysis and then forwarded to Environment Canada for further analysis.

The May 14th QA/QC sampling consisted of obtaining field blanks for PM_{10} and metals at the Frederick Street location, $PM_{2.5}$ and metals at the Kings Road location, and PAHs at tne Henry Street location.

For the May 28th QA/QC sampling, field duplicates were obtained for $PM_{2.5}$ and metals at the Intercolonial Street location, PAHs at the Frederick Street location and VOCs at the Henry Street location. It should be noted that the duplicate sampling system failed at the Henry Street location on May 28th, and as a result there was no VOC sample obtained at this location.

2.3 FIELD OBSERVATIONS

The monitoring program was performed from midnight to midnight on May 2nd, 14th, and 28th. Table 6 provides a summary of field observations for each sampling day.

TABLE 6
Summary of Field Observations

Sampling Event Date	Observations
May 2nd	• Interceptor sewer construction activities were taking place near the DesBarres Street location. Excavators and other vehicles were located in the vicinity of DesBarres Street location. • No apparent activity on Tar Ponds, Coke Ovens site and SYSCO site.
May 14th	• Rail cars containing product located within 50 metres of Intercolonial Street. • Interceptor sewer construction activities were taking place near the DesBarres Street location. • Some site work was apparent on the SYSCO property. • No apparent activity on Tar Ponds or Coke Ovens site.
May 28th	• Removal of Cooling Tower Grids was being performed on the Coke Ovens site near the Teak Street Security Gate. • Soil was excavated at the intersection of Walker and Ferry Streets. • Some site work was apparent on the SYSCO property. • Heavy dust was created from gravel covered sections on Frederick Street within 10 metres of the sampling station. Heavy commercial trucks passed by the station, during and after sampling. • Rail cars were within 50 metres of Intercolonial Street sampling location, during collection of sample media.

2.4 WEATHER PARAMETER MEASUREMENTS

Weather information for the wind speed and direction, relative humidity, and temperature parameters were obtained from the project weather station located at the former PIDC site, and from the new project weather station situated at the Coke Ovens site. The PIDC weather station is located south of the South Tar Pond off Terminal Road and is approximately 900 metres from the southwest corner of the Coke Ovens site (Figure 1). The new Coke Ovens project weather station is situated at the south perimeter of the Coke Ovens site approximately 625 metres to the NNE of the Victoria Road sampling location (Figure 1). Precipitation and barometric pressure were obtained from the Sydney Airport Environment Canada weather station. All measurements were recorded on an hourly basis.

Table 7 provides a summary of weather measurements for each of the sampling days for May.

TABLE 7
Summary of Weather Information

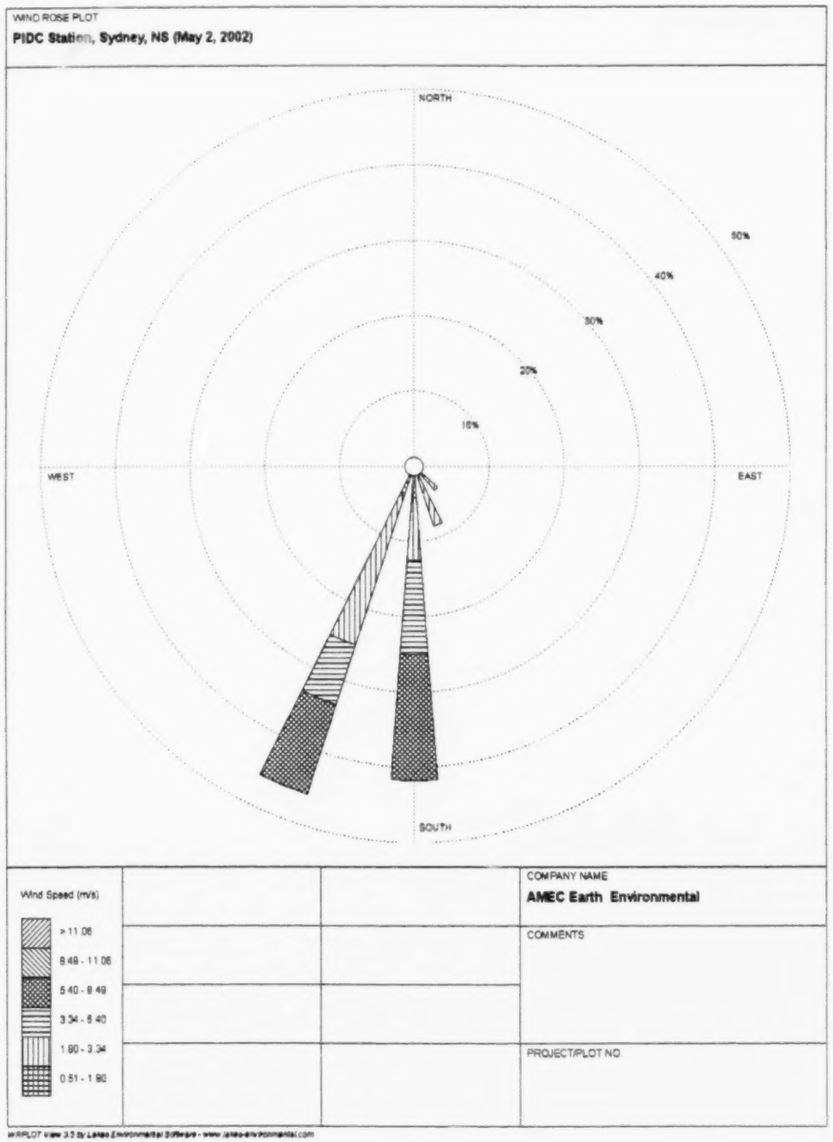
Wind Direction During Monitoring Period	% Frequency May 2nd		% Frequency May 14th		% Frequency May 28th	
	PIDC Project Weather Station	Coke Ovens Project Weather Station	PIDC Project Weather Station	Coke Ovens Project Weather Station	PIDC Project Weather Station	Coke Ovens Project Weather Station
N	-	-	-	-	-	4.2
NNE	-	-	-	-	-	-
NE	-	-	4.2	-	4.2	4.2
ENE	-	-	25.0	-	-	-
E	-	-	20.8	-	-	-
ESE	-	-	37.5	4.2	-	4.2
SE	4.2	4.2	8.3	16.7	-	-
SSE	8.3	4.2	4.2	20.8	4.2	4.2
S	41.7	37.5	-	20.8	8.3	4.2
SSW	45.8	33.3	-	29.1	33.2	25.0
SW	-	20.8	-	4.2	-	8.3
WSW	-	-	-	-	4.2	-
W	-	-	-	-	-	4.2
WNW	-	-	-	4.2	25.0	20.7
NW	-	-	-	-	16.7	8.3
NNW	-	-	-	-	4.2	12.5
Calm	-	-	-	-	-	-
Avg. Wind speed (km/hr) [m/s]	14.6 [4.1]	24.1[6.7]	15.2 [4.2]	19.4 [5.4]	11.1 [3.1]	18.9 [5.2]
Avg. Temperature (°C)	5.8	5.6	1.5	1.5	14.8	15.1
Minimum Temperature (°C)	0.7	5.0	0.4	1.3	10.3	14.4
Maximum Temperature (°C)	12.6	13	2.7	3.2	19.3	20.7
ENVIRONMENT CANADA MONTHLY DATA						
Relative Humidity (%)	68.5		80.5		68	
Total Precipitation (mm) (rain (mm) /snow (cm)) (1)	9.2 (9.2 / TR(3))		19.6 (19.2 / 0.4)		0.0 (0.0 / 0.0)	
Barometric Pressure (KPa)	100.53		100.75		101.38	
Fog	NO		YES		YES	
Snow Cover	NO		NO		NO	

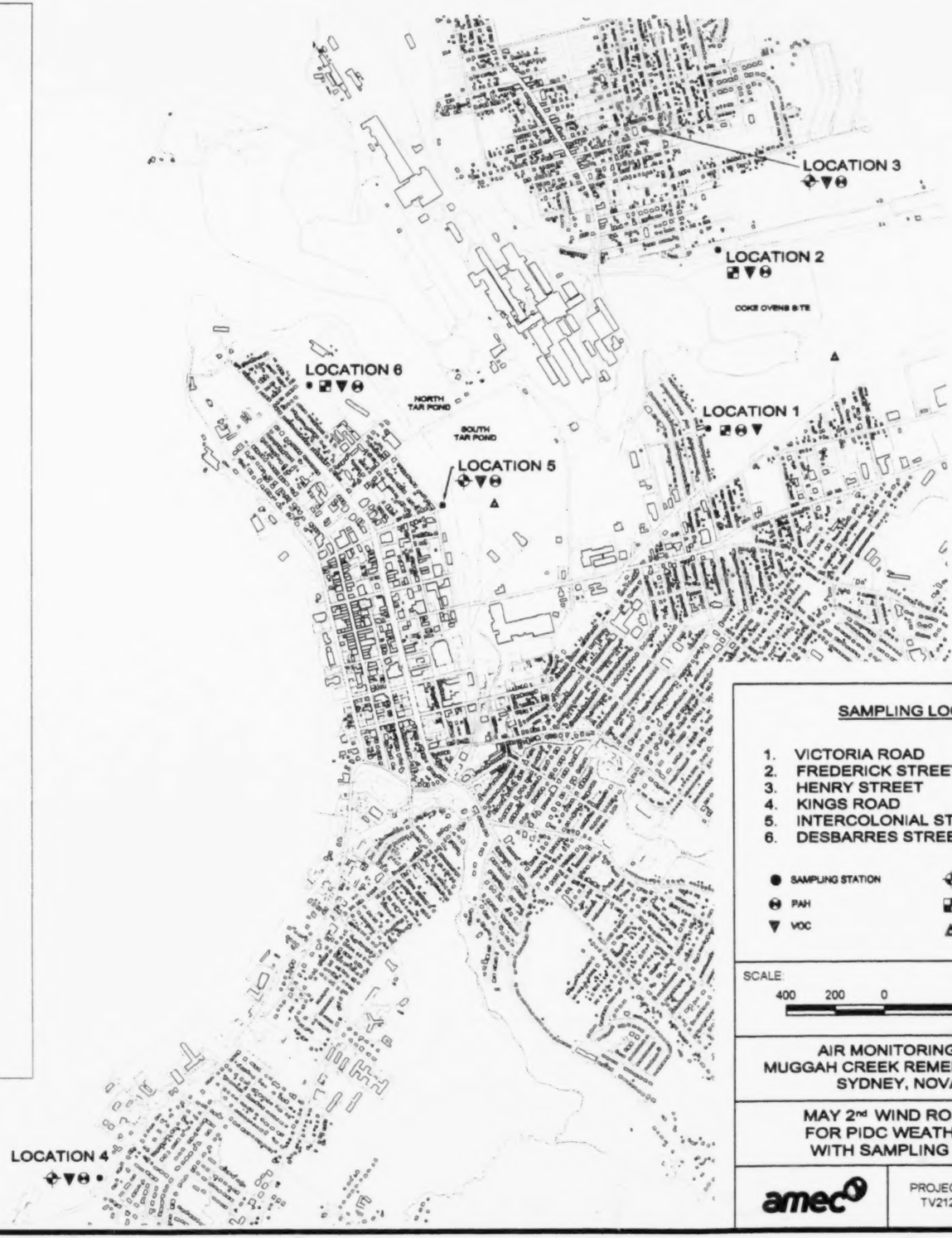
Note: (1) Rain is reported in mm, snow in cm.
(2) NA denotes not available.
(3) Trace

Figures 2 to 7 provide graphical presentations of wind direction and speed in the form of wind roses overlaid on a plan view of the sampling locations for each sampling day. The wind roses provide information on wind frequency, direction and speed for each sampling day. The length of each bar for a direction indicates the percent of time the wind blows from that direction. The wind direction is defined as that from which the wind is blowing (*i.e.*, a north wind comes from the north). Each hatch pattern within the wind rose bars represents the percentage of time for a velocity. A legend is included on each wind rose for interpretation.

Winds were prevailing from the SSW direction on May 2nd and May 28th, and ESE direction on May 14th at the PIDC project weather station location. Winds were prevailing from the S/SSW direction on May 2nd, SE direction on May 14th and SSW/WNW on May 28th at the Coke Ovens project weather station location.

The winds at the PIDC project weather station location were strongest on May 14th with an average wind speed of 15.2 km/hr, followed by May 2nd with an average wind speed of 14.6 km/hr, and finally, May 28th with an average wind speed of 11.1 km/hr. The winds at the Coke Ovens project weather station location were strongest on May 2nd with an average wind speed of 25.7 km/hr, followed by May 28th with an average wind speed of 23.8 km/hr, and finally, May 14th with an average wind speed of 16.8 km/hr.





SAMPLING LOCATIONS

1. VICTORIA ROAD
2. FREDERICK STREET
3. HENRY STREET
4. KINGS ROAD
5. INTERCOLONIAL STREET
6. DESBARRES STREET

- SAMPLING STATION
- PAH
- VOC
- PM2.5 / METALS
- PM10 / METALS
- PROJECT WEATHER STATIONS

SCALE:
400 200 0 400 800m

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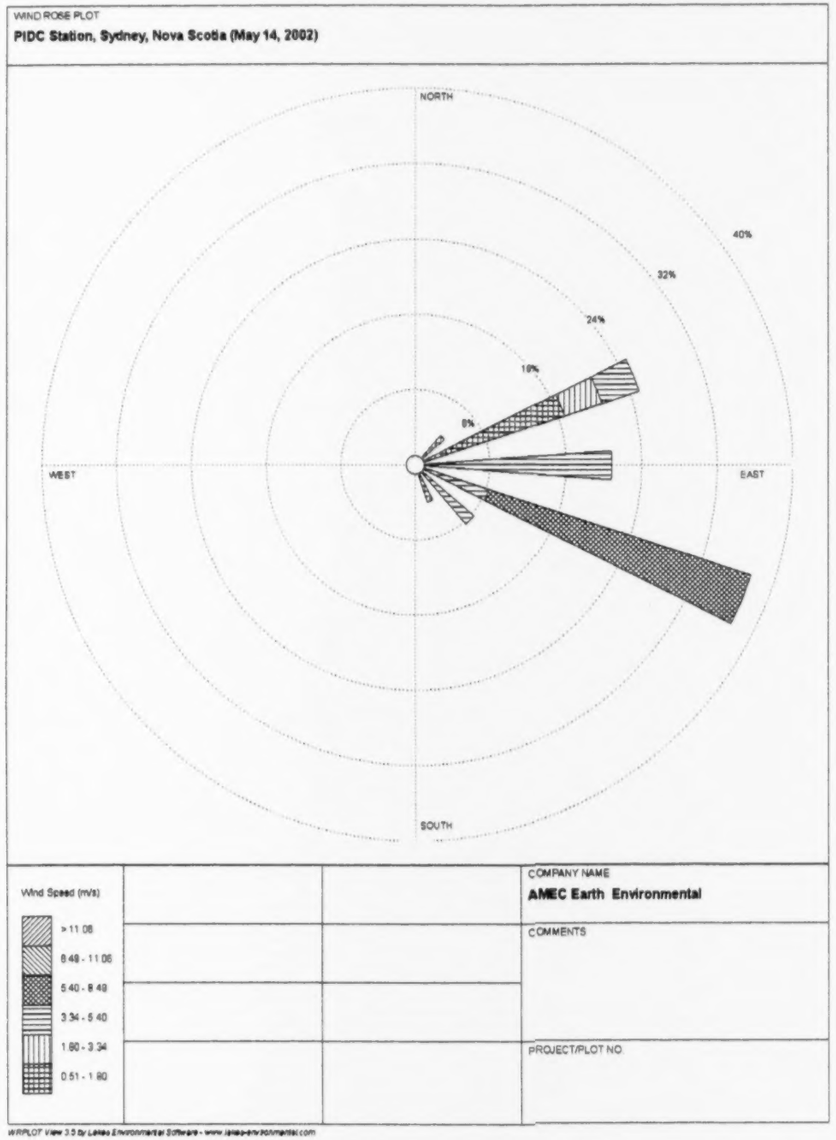
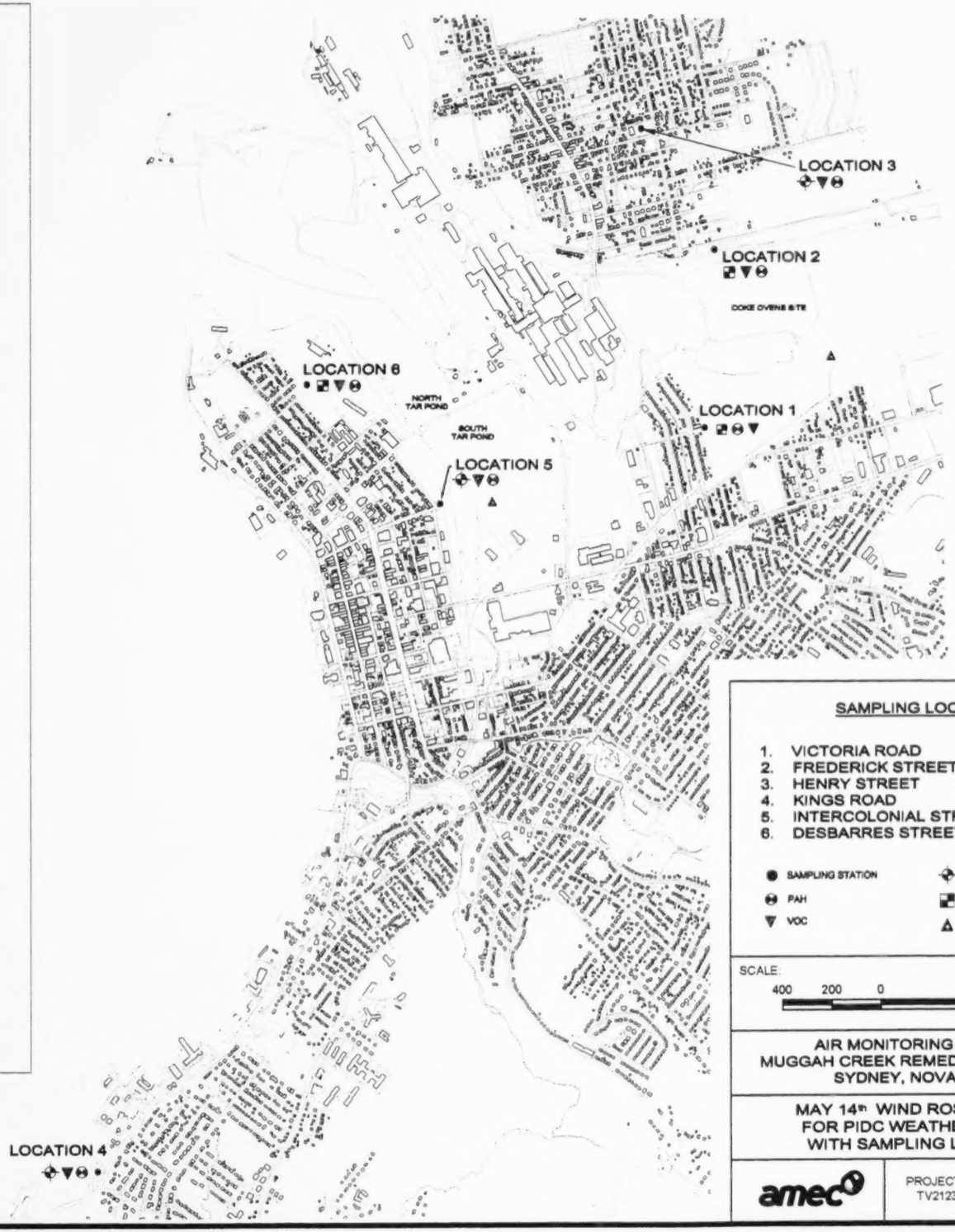
SYDNEY, NOVA SCOTIA

MAY 2nd WIND ROSE DIAGRAM FOR PIDC WEATHER STATION WITH SAMPLING LOCATIONS

amec | PROJECT NO: TV21233 | **FIGURE 2**





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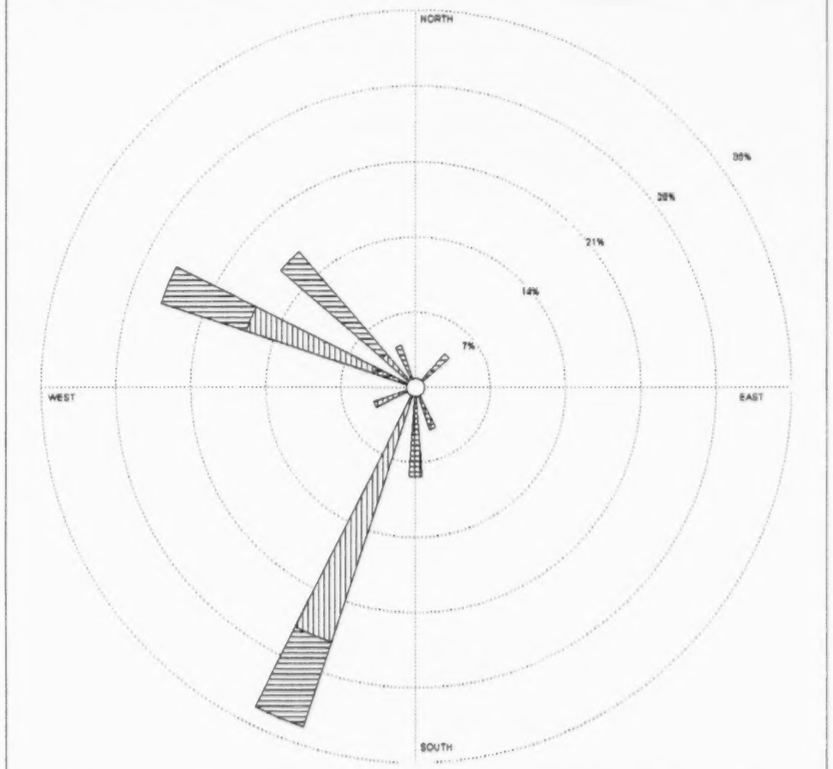
MAY 14th WIND ROSE DIAGRAM
FOR PIDC WEATHER STATION
WITH SAMPLING LOCATIONS

amec | PROJECT NO: TV21233 | FIGURE 3

WIND ROSE PLOT

PIDC Station, Sydney, Nova Scotia (May 28, 2002)

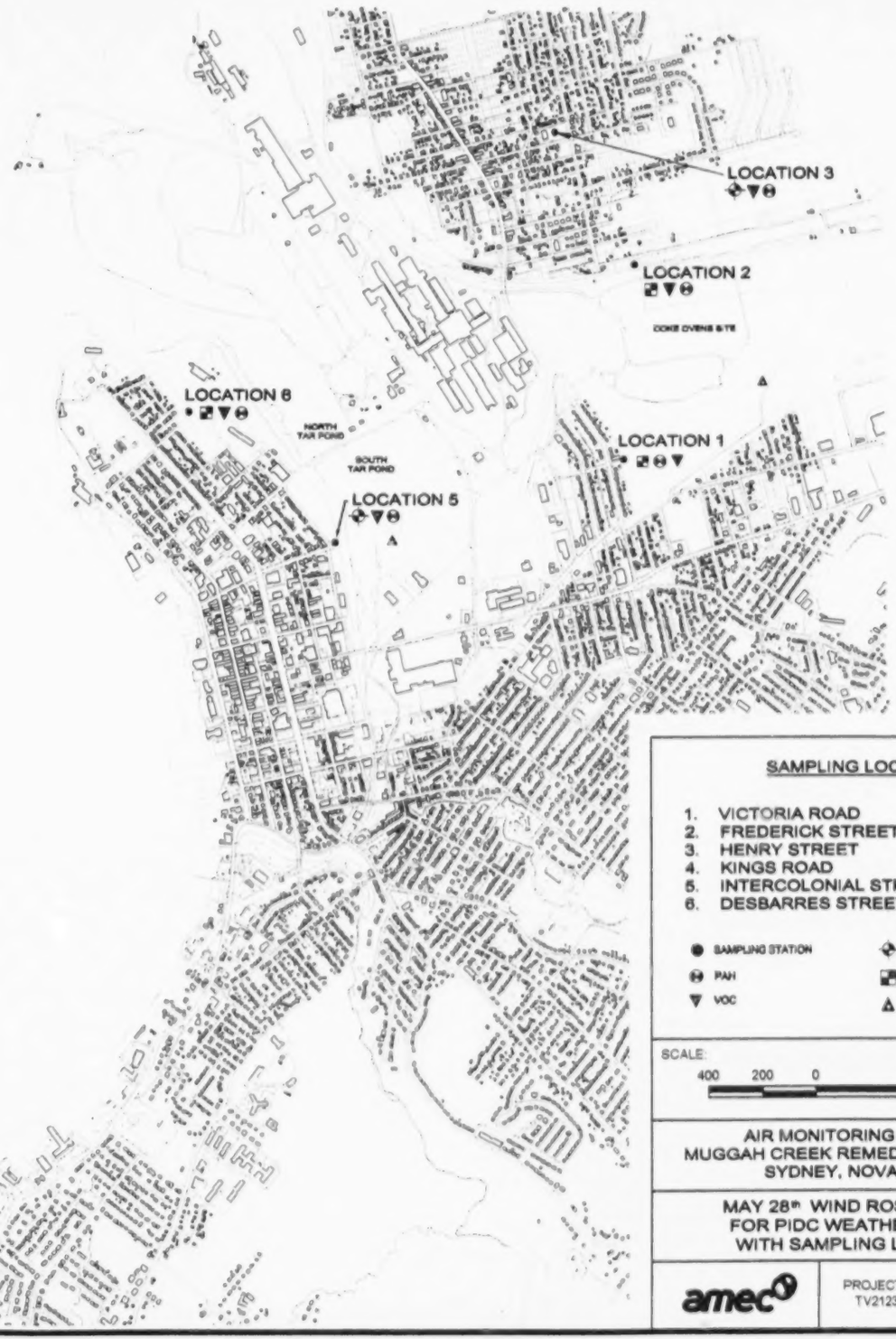


Wind Speed (m/s)

- > 11.08
- 8.49 - 11.08
- 5.40 - 8.49
- 3.34 - 5.40
- 1.80 - 3.34
- 0.51 - 1.80

		COMPANY NAME: **AMEC Earth Environmental**
		COMMENTS
		PROJECT/PLOT NO.

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com



N

SAMPLING LOCATIONS

1. VICTORIA ROAD
2. FREDERICK STREET
3. HENRY STREET
4. KINGS ROAD
5. INTERCOLONIAL STREET
6. DESBARRES STREET

- SAMPLING STATION
- PAH
- VOC
- PM2.5 / METALS
- PM10 / METALS
- PROJECT WEATHER STATIONS

SCALE:

400 200 0 400 800m

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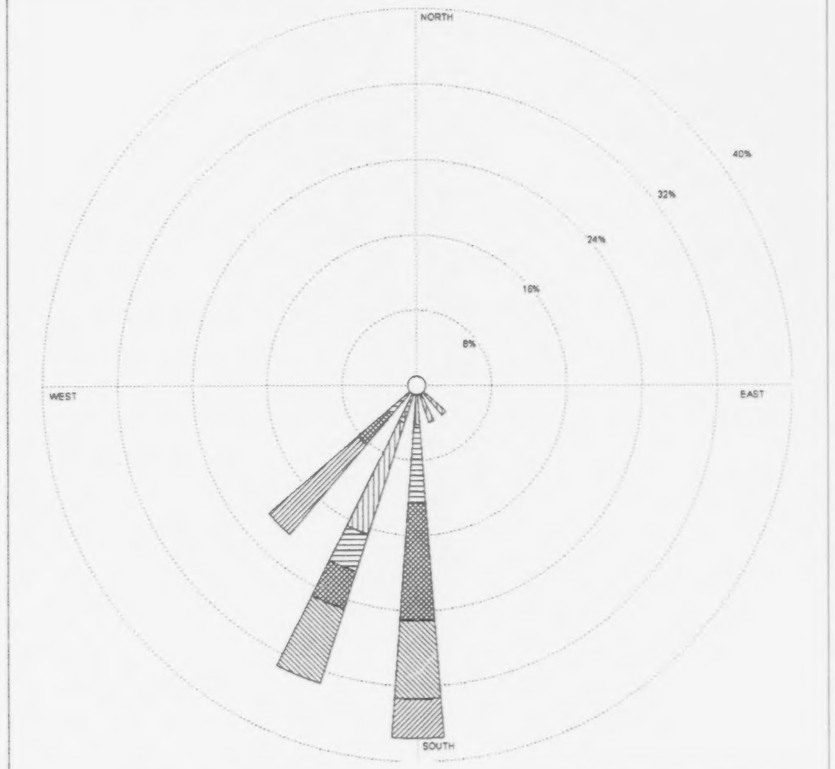
SYDNEY, NOVA SCOTIA

MAY 28th WIND ROSE DIAGRAM FOR PIDC WEATHER STATION WITH SAMPLING LOCATIONS

amec | PROJECT NO: TV21233 | FIGURE 4

WIND ROSE PLOT

Coke Ovens Station, Sydney, Nova Scotia (May 2, 2002)



Wind Speed (m/s)

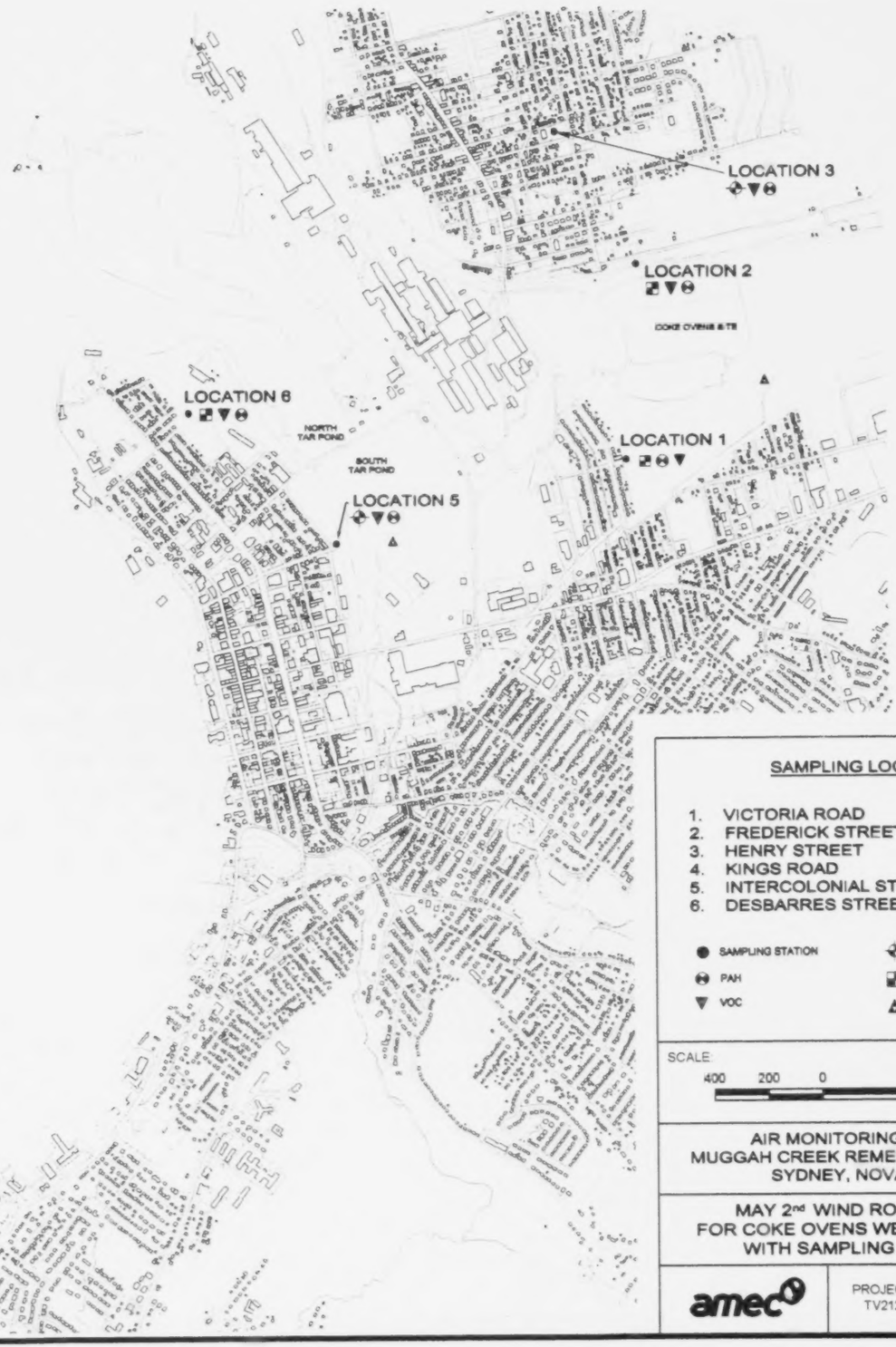
- > 11.06
- 8.49 - 11.06
- 5.40 - 8.49
- 3.34 - 5.40
- 1.80 - 3.34
- 0.51 - 1.80

COMPANY NAME: **AMEC Earth Environmental**

COMMENTS: **Direction (blowing from)**

PROJECT/PLOT NO:

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com



SAMPLING LOCATIONS

1. VICTORIA ROAD
2. FREDERICK STREET
3. HENRY STREET
4. KINGS ROAD
5. INTERCOLONIAL STREET
6. DESBARRES STREET

- SAMPLING STATION
- PAH
- VOC
- PM2.5 / METALS
- PM10 / METALS
- PROJECT WEATHER STATIONS

SCALE: 400 200 0 400 800m

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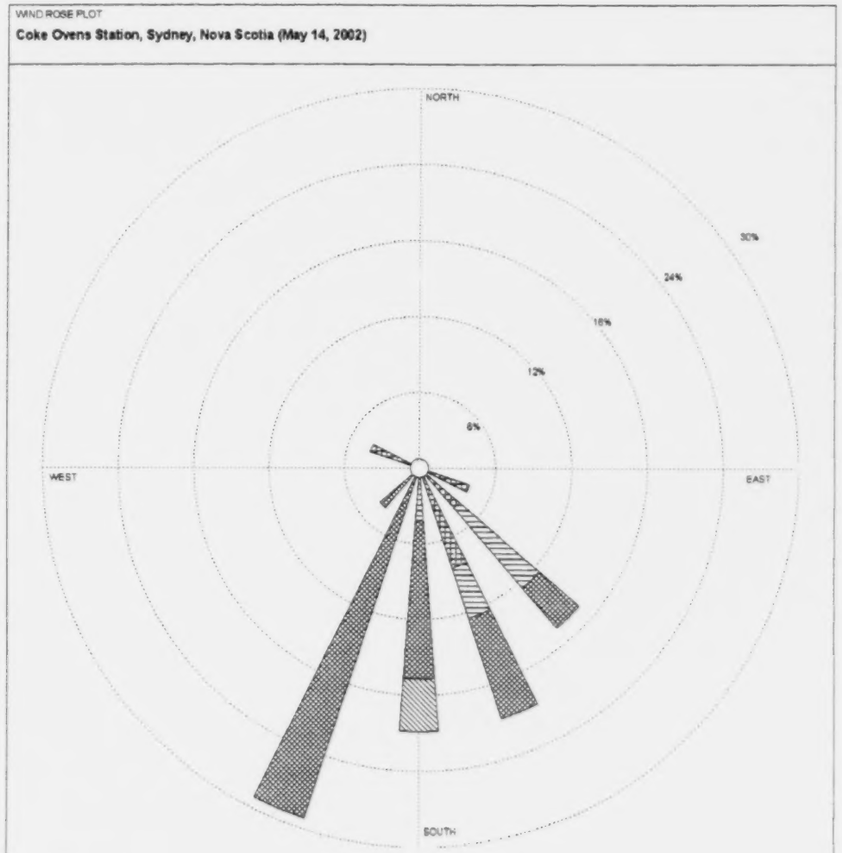
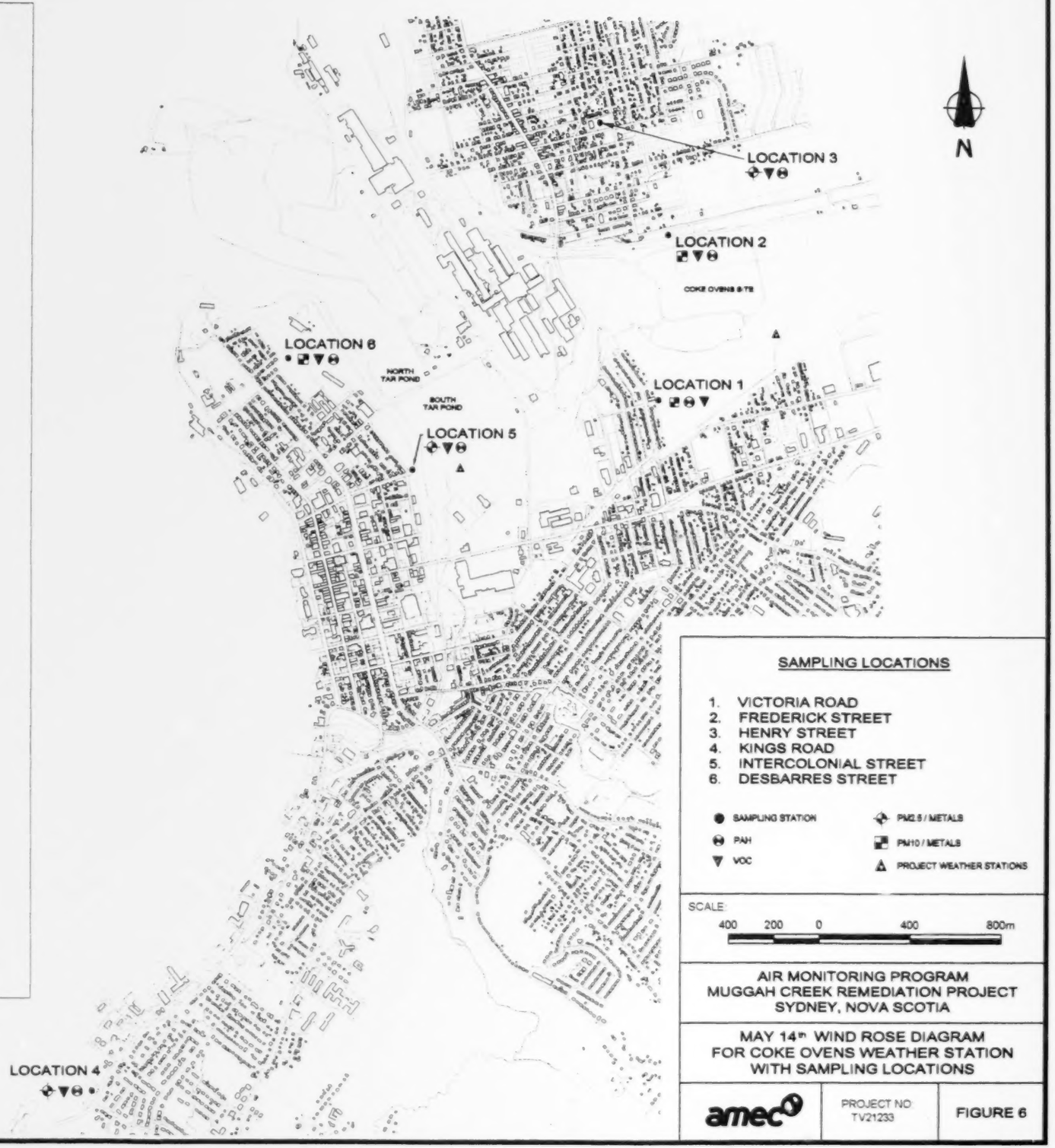
MUGGAH CREEK REMEDIATION PROJECT
SYDNEY, NOVA SCOTIA

MAY 2nd WIND ROSE DIAGRAM FOR COKE OVENS WEATHER STATION WITH SAMPLING LOCATIONS

amec | PROJECT NO TV21233 | **FIGURE 5**





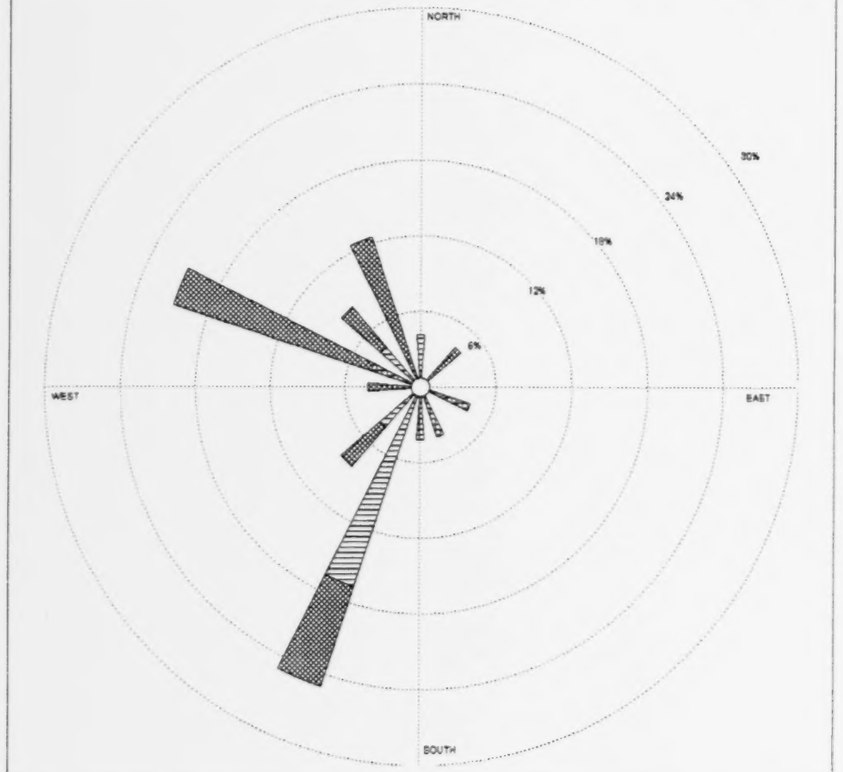
AIR MONITORING PROGRAM
MUGGAH CREEK REMEDIATION PROJECT
SYDNEY, NOVA SCOTIA

MAY 14th WIND ROSE DIAGRAM
FOR COKE OVENS WEATHER STATION
WITH SAMPLING LOCATIONS

amec | PROJECT NO TV21233 | FIGURE 6

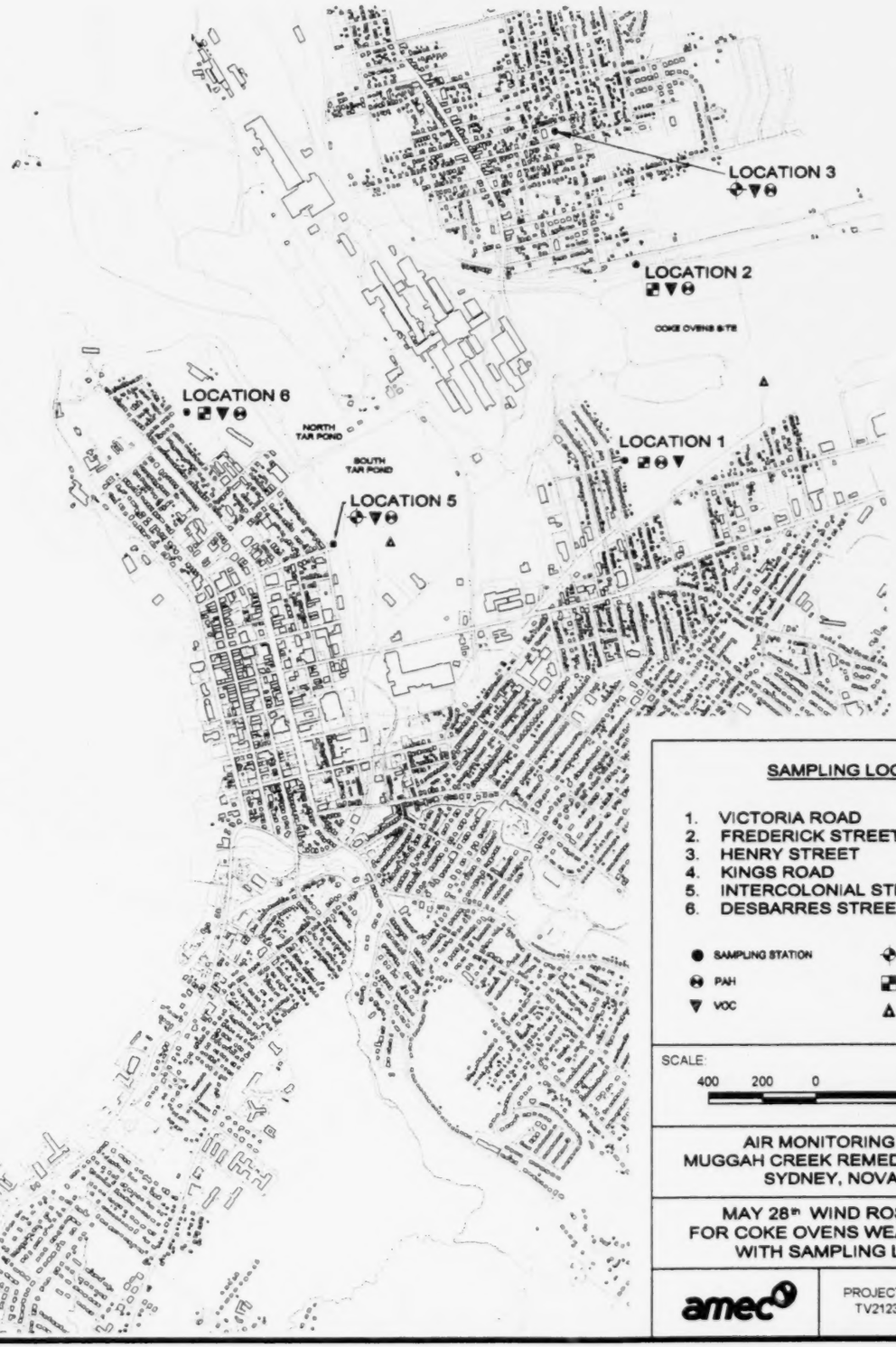
WIND ROSE PLOT

Coke Ovens Station, Sydney, Nova Scotia (May 28, 2002)



Wind Speed (m/s) > 11.06 8.49 - 11.06 5.40 - 8.49 3.34 - 5.40 1.80 - 3.34 0.51 - 1.80			COMPANY NAME **AMEC Earth Environmental**
			COMMENTS **Direction (blowing from)**
			PROJECT/PLOT NO.

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com



SAMPLING LOCATIONS

1. VICTORIA ROAD
2. FREDERICK STREET
3. HENRY STREET
4. KINGS ROAD
5. INTERCOLONIAL STREET
6. DESBARRES STREET

- SAMPLING STATION
- PAH
- VOC
- PM2.5 / METALS
- PM10 / METALS
- PROJECT WEATHER STATIONS

SCALE:
400 200 0 400 800m

AIR MONITORING PROGRAM
MUGGAH CREEK REMEDIATION PROJECT
SYDNEY, NOVA SCOTIA

MAY 28th WIND ROSE DIAGRAM FOR COKE OVENS WEATHER STATION WITH SAMPLING LOCATIONS

amec | PROJECT NO: TV21233 | **FIGURE 7**

3.0 PROGRAM RESULTS

The following section provides a summary of $PM_{2.5}$, PM_{10}, metals, PAH and VOC results for the month of May. The tables in this section summarize only those values that were detected. Refer to Appendix "B" for a complete set of results contained in the Data Validation Memorandum.

A review of available Nova Scotia standards and guidelines indicate that Nova Scotia does not have criteria for any of the parameters sampled for in this program. The province of Ontario does provide ambient air quality criteria (AAQC) for many of the program parameters and these have been included in the tables for this section.

In addition, the Canadian Environmental Protection Agency (CEPA) provides a Canada Wide Standard (CWS) of 30 $\mu g/m^3$ for $PM_{2.5}$. CEPA does not provide a CWS for PM_{10}. Until a CWS is developed for PM_{10}, CEPA suggests the use of criteria developed in other jurisdictions. For the Sydney AAMP, a 24-hour criterion of 50 $\mu g/m^3$ for PM_{10} has been applied, which is the criterion being used in Ontario and British Columbia. The exception is the monitoring locations at the perimeter (Refer to Section 4) of the Coke Ovens site, where a 24-hour criterion of 25 $\mu g/m^3$ for PM_{10} has been applied during periods of activity at the site, as developed in the Interim Separation Zone Criteria study.

3.1 $PM_{2.5}$, PM_{10} AND METALS RESULTS

Tables 8 to 10 provide a summary of $PM_{2.5}$, PM_{10}, and metals results for the six sampling locations for the May 2nd, 14th and 28th sampling events, respectively.

TABLE 8
Summary of $PM_{2.5}$, PM_{10}, and Metals Results May 2nd Event [1]

Parameter	Victoria Road PM_{10} Results ($\mu g/m^3$)		Victoria Road PM_{10} Duplicate Results ($\mu g/m^3$)		Frederick Street PM_{10} Results ($\mu g/m^3$)		DesBarres Street PM_{10} Results ($\mu g/m^3$)		Henry Street $PM_{2.5}$ Results ($\mu g/m^3$)		Kings Road $PM_{2.5}$ Results ($\mu g/m^3$)		Intercolonial Street $PM_{2.5}$ Results ($\mu g/m^3$)		Intercolonial Street $PM_{2.5}$ Duplicate Results ($\mu g/m^3$)		24-hour Guidelines ($\mu g/m^3$)
PM_{10}	12.2		12.9		11.3		8.6		NA[2]		NA		NA		NA		50[3]
$PM_{2.5}$	NA		NA		NA		NA		<20.8	U	<20.8	U	<20.8	U	<20.8	U	30[4]
Aluminum	0.2		0.2		0.3		0.1		<0.83	U	<0.83	U	<0.83	U	<0.83	U	na[5]
Copper	0.03		0.08		0.03		0.01		<0.083	U	<0.083	U	<0.083	U	<0.083	U	na
Iron	0.3		0.4		0.5		0.2		<4.2	U	<4.2	U	<4.2	U	<4.2	U	na
Lead	0.002		0.003		0.003		0.007		<0.042	U	<0.042	U	<0.042	U	<0.042	U	na
Manganese	<0.01	U	0.01		0.02		<0.01	U	<0.042	U	<0.042	U	<0.042	U	<0.042	U	na
Sodium	<0.4	U	<0.4	U	<0.4	U	<0.6	UB	<12.5	U	<12.5	U	<12.5	U	<12.5	U	na
Vanadium	<0.001	U	<0.001	U	<0.001	U	<0.001	U	<0.002	U	<0.083	U	<0.083	U	<0.083	U	na
Zinc	<0.1	U	<0.1	U	<0.1	U	<0.1	U	<0.083	U	<0.083	U	<0.083	U	<0.083	U	na
Magnesium	0.1		0.2		0.2		<0.1	U	<2.49	U	<2.49	U	<2.49	U	<2.49	U	na
Arsenic	<0.001	U	<0.001	U	<0.001	U	0.012		<0.0249	U	<0.0249	U	<0.0249	U	<0.0249	U	na

Notes :
(1) Not detected values are reported at detection limit and are shown with a < symbol.
(2) NA denotes not applicable.
(3) Ontario MOE 24-hour Ambient Air Quality Criteria.
(4) CEPA 24-hour Canada Wide Standard.
(5) na denotes not available.
U = Non-detected at the stated limit.
UB = Non-detected with elevated reporting limit as a result of method blank contamination.

TABLE 9
Summary of $PM_{2.5}$, PM_{10}, and Metals Results May 14th Event [1]

Parameter	Victoria Road PM_{10} Results ($\mu g/m^3$)	Frederick Street PM_{10} Results ($\mu g/m^3$)	Frederick Street PM_{10} Field Blank Results (mg/filter)	DesBarres Street PM_{10} Results ($\mu g/m^3$)	Henry Street $PM_{2.5}$ Results ($\mu g/m^3$)	Kings Road $PM_{2.5}$ Results ($\mu g/m^3$)	Kings Road $PM_{2.5}$ Field Blank Results (mg/filter)	Intercolonial Street $PM_{2.5}$ Results ($\mu g/m^3$)	24-hour Guidelines ($\mu g/m^3$)
PM_{10}	6.1	14.7	<0.5	10.8	NA[2]	NA	NA	NA	50[3]
$PM_{2.5}$	NA	NA	NA	NA	<20.8 U	<20.8 U	<0.5 U	<20.8 U	30[4]
Aluminum	0.4	<0.1 U	<0.2 U	0.2	<0.83 U	<0.83 U	<0.02 U	<0.83 U	na[5]
Antimony	<0.001 U	<0.001 U	0.004	<0.002 U	<0.0166 U	<0.0166 U	<0.0004 U	<0.0166 U	na
Calcium	0.5	<0.4 U	<0.7 U	0.8	<4.2 U	<4.2 U	<0.1 U	<4.2 U	na
Copper	0.04	0.01	<0.02 U	0.04	<0.083 U	<0.083 U	<0.002 U	<0.083 U	na
Iron	0.6	0.2	<0.1 U	0.4	<4.2 U	<4.2 U	<0.1 U	<4.2 U	na
Lead	0.002	0.003	<0.002 U	0.005	<0.042 U	<0.042 U	<0.001 U	<0.042 U	na
Manganese	0.02	<0.01 U	<0.02 U	<0.01 U	<0.042 U	<0.042 U	<0.001 U	<0.042 U	na
Sodium	<1.5 UB	<1.3 UB	0.8	<1.5 UB	<12.5 U	<12.5 U	<0.3 U	<12.5 U	na
Magnesium	0.3	0.1	<0.2 U	0.2	<2.49 U	<2.49 U	<0.06 U	<2.49 U	na
Potassium	<0.6 UB	<0.6 UB	<0.6 U	<0.5 UB	<24.9 U	<24.9 U	<0.6 U	<24.9 U	na
Arsenic	0.003	0.004	<0.002 U	0.003	<0.0249 U	<0.0249 U	<0.0006 U	<0.0249 U	na

Notes :
(1) Not detected values are reported at detection limit and are shown with a < symbol.
(2) NA denotes not applicable.
(3) Ontario MOE 24-hour Ambient Air Quality Criteria.
(4) CEPA 24-hour Canada Wide Standard.
(5) na denotes not available.
U = Non-detected at the stated limit.
UB = Non-detected with elevated reporting limit as a result of method blank contamination.

TABLE 10
Summary of $PM_{2.5}$, PM_{10}, and Metals Results May 28th Event [1]

Parameter	Victoria Road PM_{10} Results ($\mu g/m^3$)	Frederick Street PM_{10} Results ($\mu g/m^3$)	DesBarres Street PM_{10} Results ($\mu g/m^3$)	Henry Street $PM_{2.5}$ Results ($\mu g/m^3$)	Kings Road $PM_{2.5}$ Results ($\mu g/m^3$)	Intercolonial Street $PM_{2.5}$ Results ($\mu g/m^3$)	Intercolonial Street $PM_{2.5}$ Duplicate Results ($\mu g/m^3$)	24-hour Guidelines ($\mu g/m^3$)
PM_{10}	14.3	169	19.1	NA[2]	NA	NA	NA	50[3]
$PM_{2.5}$	NA	NA	NA	<20.8 U	<20.8 U	<20.8 U	<20.8 U	30[4]
Aluminum	0.1	3.0	<0.1 U	<0.83 U	<0.83 U	2.91	<0.83 U	na[5]
Barium	<0.01 U	0.02	<0.01 U	<0.0166 U	<0.0166 U	<0.0166 U	<0.0166 U	na
Chromium	<0.001 U	0.004	<0.001 U	<0.083 U	<0.083 U	<0.083 U	<0.083 U	na
Cobalt	<0.001 U	0.002	<0.001 U	<0.042 U	<0.042 U	<0.042 U	<0.042 U	na
Calcium	0.7	1.8	1.1	<4.2 U	<4.2 U	<4.2 U	<4.2 U	na
Copper	0.03	0.03	0.06	<0.083 U	<0.083 U	<0.083 U	0.125	na
Iron	<0.4 UB	5.0	<0.4 UB	<4.2 U	<4.2 U	<4.2 U	<4.2 U	na
Lead	0.006	0.010	0.002	<0.042 U	<0.042 U	<0.042 U	<0.042 U	na
Lithium	<0.001 U	0.004	<0.001 U	<0.042 U	<0.042 U	<0.042 U	<0.042 U	na
Manganese	0.01	0.25	0.02	<0.042 U	<0.042 U	<0.042 U	<0.042 U	na
Sodium	<0.4 U	<0.4 UB	<0.4 U	<12.5 U	<12.5 U	<12.5 U	<12.5 U	na
Vanadium	0.001	0.010	0.002	<0.083 U	<0.083 U	<0.083 U	<0.083 U	na
Strontium	<0.003 U	<0.003 U	<0.003 U	<0.083 U	<0.083 U	<0.083 U	<0.083 U	na
Magnesium	0.2	2.1	0.2	<2.49 U	<2.49 U	<2.49 U	<2.49 U	na
Potassium	<0.4 U	0.4	<0.4 U	<24.9 U	<24.9 U	<24.9 U	<24.9 U	na
Arsenic	<0.001 U	<0.001 U	<0.001 U	<0.0249 U	<0.0249 U	<0.0249 U	<0.0249 U	na

Notes :
(1) Not detected values are reported at detection limit and are shown with a < symbol.
(2) NA denotes not applicable.
(3) Ontario MOE 24-hour Ambient Air Quality Criteria.
(4) CEPA 24-hour Canada Wide Standard.
(5) na denotes not available.
U = Non-detected at the stated limit.
UB = Non-detected with elevated reporting limit as a result of blank contamination.

The CEPA provides a CWS of 30 $\mu g/m^3$ for the $PM_{2.5}$ parameter and the Ontario Ministry of Environment (MOE) provides a 24-hour AAQC of 50 $\mu g/m^3$ for the PM_{10} parameter. A comparison of $PM_{2.5}$ results with the CWS and the PM_{10} results with the MOE AAQC indicates

there were no exceedances to the referenced guidelines, with the exception of a PM_{10} exceedance (169 $\mu g/m^3$) at the Frederick Street location on May 28th. Winds were predominantly from Whitney Pier during the sampling period and there was heavy commercial truck traffic along Frederick Street.

A comparison of metals results to regulatory criteria could not be performed since there are currently no regulations or guidelines for Nova Scotia, the rest of Canada nor the United States for metals that are sampled as $PM_{2.5}$ and PM_{10}.

3.2 PAH RESULTS

Tables 11 to 13 provide a summary of PAH results for the May 2nd, 14th and 28th sampling events, respectively.

TABLE 11
Summary of PAH Results May 2nd Event (1)

Parameter	Victoria Road Result (ng/m^3)	Frederick Street Result (ng/m^3)	Henry Street Result (ng/m^3)	Kings Road Result (ng/m^3)	Intercolonial Street Result (ng/m^3)	DesBarres Street Result (ng/m^3)	Ontario Ambient Air Quality 24-hour Criteria (ng/m^3)
Naphthalene	<0.71 UB	2.8	<1.32 UB	<0.78 UB	<1.36 UB	<0.98 UB	22500
Acenaphthylene	0.46	0.36	0.99	0.36	0.58	0.51	na(2)
Acenaphthene	0.3	0.78	0.39	0.21	1.27	0.32	na
Fluorene	1.62	2.44	3.3	1.04	3.5	2.12	na
Phenanthrene	5.7	6.1	17.4	3.3	9.3	9.5	na
Anthracene	0.46	0.39	3.3	0.27	0.81	1.11	na
Fluoranthene	1.11	1.22	6.3	0.57	1.59	2.06	na
Pyrene	0.94	0.64	6.9	0.51	1.45	2.09	na
Benzo(a)anthracene	<0.14 U	<0.14 U	1.08	<0.15 U	0.14	0.32	na
Chrysene	0.17	<0.14 U	1.71	<0.15 U	0.26	0.47	na
Benzo Fluoranthene	0.23	<0.28 U	2.17	<0.15 U	0.38	0.70	na
Benzo(a)pyrene	<0.14 U	<0.14 U	0.84	<0.30 U	<0.14 U	0.19	1.1
Indeno(1,2,3-cd)pyrene	<0.14 U	<0.14 U	0.90	<0.15 U	<0.14 U	0.28	na
Dibenz(a,h)anthracene	<0.14 U	<0.14 U	<0.15 U	<0.15 U	<0.14 U	<0.16 U	na
Benzo(g,h,i)perylene	<0.14 U	<0.14 U	0.99	<0.15 U	0.17	0.25	na
Total PAH (3)	12.1	15.3	47.7	7.7	21.0	21.0	na

Notes : (1) not detected values are reported at detection limit and are shown with a < symbol.
(2) na denotes not available
(3) Total PAH is the sum of all reported values, including PAHs with values reported as non-detect, using values at half the detection limit.
U = Non-detected at the stated reporting limit.
UB = Non-detected with the elevated reporting limit, as a result of method blank contamination

TABLE 12
Summary of PAH Results May 14th Event (1)

Parameter	Victoria Road Result (ng/m³)	Frederick Street Result (ng/m³)	Henry Street Result (ng/m³)	Henry Street Field Blank Result (ug/PUF)	Kings Road Result (ng/m³)	Intercolonial Street Result (ng/m³)	DesBarres Street Result (ng/m³)	Ontario Ambient Air Quality 24-hour Criteria (ng/m³)
Naphthalene	<0.51 UB	<0.42 UB	<0.49 UB	<0.05 U	<0.71 UB	<0.97 UB	<0.59 UB	22500
Acenaphthylene	0.26	0.14	0.70	<0.05 U	0.74	0.29	0.40	na(2)
Acenaphthene	0.17	1.05	0.46	<0.05 U	0.36	0.83	0.83	na
Fluorene	1.67	1.83	1.69	<0.05 U	1.90	2.60	2.49	na
Phenanthrene	3.4	3.3	4.0	<0.05 U	5.3	4.9	4.3	na
Anthracene	0.28	0.25	0.49	<0.05 U	0.59	0.40	0.40	na
Fluoranthene	0.71	0.69	0.95	<0.05 U	1.42	1.08	0.95	na
Pyrene	0.48	0.36	0.92	<0.05 U	1.24	0.57	0.62	na
Benzo(a)anthracene	<0.14 U	<0.14 U	<0.15 U	<0.05 U	0.18	<0.14 U	<0.15 U	na
Chrysene	0.23	0.14	0.18	<0.05 U	0.39	0.20	0.18	na
Benzo Fluoranthene	0.31	<0.28 U	<0.31 U	<0.10 U	0.50	<0.29 U	<0.31 U	na
Benzo(a)pyrene	<0.14 U	<0.14 U	<0.15 U	<0.05 U	<0.15 U	<0.14 U	<0.15 U	1.1
Indeno(1,2,3-cd)pyrene	<0.14 U	<0.14 U	<0.15 U	<0.05 U	0.18	<0.14 U	<0.15 U	na
Dibenz(a,h)anthracene	<0.14 U	<0.14 U	<0.15 U	<0.05 U	<0.15 U	<0.14 U	<0.15 U	na
Benzo(g,h,i)perylene	<0.14 U	<0.14 U	<0.15 U	<0.05 U	0.24	<0.14 U	<0.15 U	na
Total PAH (3)	8.4	8.7	10.4		13.9	12.8	11.3	na

Notes :
(1) not detected values are reported at detection limit and are shown with a < symbol.
(2) na denotes not available
(3) Total PAH is the sum of all reported values, including PAHs with values reported as non-detect, using values at half the detection limit.
U = Non-detected at the stated reporting limit.
UB = Non-detected with the elevated reporting limit, as a result of method blank contamination

TABLE 13
Summary of PAH Results May 28th Event (1)

Parameter	Victoria Road Result (ng/m³)	Frederick Street Result (ng/m³)	Frederick Street Field Duplicate Result (ng/m³)	Henry Street Result (ng/m³)	Kings Road Result (ng/m³)	Intercolonial Street Result (ng/m³)	DesBarres Street Result (ng/m³)	Ontario Ambient Air Quality 24-hour Criteria (ng/m³)
Naphthalene	4.9	0.86	0.90	1.77	1.63	3.6	2.95	22500
Acenaphthylene	1.33	0.43	0.45	1.17	0.42	0.62	0.47	na(2)
Acenaphthene	1.94	0.86	0.76	1.14	0.51	2.55	1.80	na
Fluorene	3.2	1.43	1.44	2.34	1.46	4.4	2.92	na
Phenanthrene	7.2	6.6	6.5	12.0	4.2	12.4	7.8	na
Anthracene	0.55	0.46	0.42	1.74	0.30	1.04	0.59	na
Fluoranthene	1.18	1.38	1.27	3.2	0.68	2.28	1.46	na
Pyrene	0.75	0.75	0.70	3.04	0.51	1.21	0.78	na
Benzo(a)anthracene	<0.14 U	<0.14 U	<0.14 U	0.44	<0.15 U	<0.15 U	<0.16 U	na
Chrysene	<0.14 U	0.17	0.14	0.70	<0.15 U	0.18	<0.16 U	na
Benzo Fluoranthene	<0.29 U	<0.29 U	<0.28 U	0.85	<0.30 U	<0.30 U	<0.31 U	na
Benzo(a)pyrene	<0.14 U	<0.14 U	<0.14 U	0.28	<0.15 U	<0.15 U	<0.16 U	1.1
Indeno(1,2,3-cd)pyrene	<0.14 U	<0.14 U	<0.14 U	0.35	<0.15 U	<0.15 U	<0.16 U	na
Dibenz(a,h)anthracene	<0.14 U	<0.14 U	<0.14 U	<0.16 U	<0.15 U	<0.15 U	<0.16 U	na
Benzo(g,h,i)perylene	<0.14 U	<0.14 U	<0.14 U	0.41	<0.15 U	<0.15 U	<0.16 U	na
Total PAH (3)	21.6	13.6	13.0	29.5	10.3	28.8	19.4	na

Notes :
(1) not detected values are reported at detection limit and are shown with a < symbol.
(2) na denotes not available
(3) Total PAH is the sum of all reported values, including PAHs with values reported as non-detect, using values at half the detection limit.
(4) NA denotes not applicable.
U = Non-detected at the stated reporting limit.

Results for naphthalene and benzo(a)pyrene were below the 24-hour guideline values provided by the Ontario Ministry of the Environment.

3.3 VOC RESULTS

On May 2nd and 28th, duplicate VOC samples were obtained at the DesBarres Street and Henry Street locations, respectively. The May 2nd samples were processed at both the PSC laboratory and the Environment Canada laboratory in Ottawa. On May 28th the duplicate sampling system failed at the Henry Street location, and as a result there was no VOC sample obtained at this location. Tables 14 and 16 include the PSC results for the duplicate samples. Section 3.4 and Appendix "B" contain an interpretation of both sets of results.

Tables 14 to 16 provide a summary of VOC results for the May 2nd, 14th and 28th sampling events.

TABLE 14
Summary of VOC Results May 2nd Event (1)

Parameter	MDL (µg/m³)	Victoria Road Results (µg/m³)		Frederick Street Results (µg/m³)		Henry Street Results (µg/m³)		Kings Road Results (µg/m³)		Intercolonial Street Results (µg/m³)		DesBarres Street Results (µg/m³)		DesBarres Street Duplicate Results (µg/m³)		Ontario Ambient Air Quality 24-hour Criteria (µg/m³)
Dichlorodifluoromethane	0.71	<0.71	U	<0.71	U	<0.71	U	<0.71	U	<0.71	U	2.86	JC	<2.48	U	500,000
Chloromethane	0.60	1.36	JC	<0.60	U	<0.60	U	<0.60	U	<0.60	U	<2.27	U	<2.07	U	7,000
Chloroethane	0.24	<0.24	U	<0.24	U	<0.24	U	<0.24	U	0.63	JC	<0.87	U	<0.84	U	na(2)
Trichlorofluoromethane	0.79	1.69	JC	<0.79	U	<0.79	U	<0.79	U	1.52	JC	<2.92	U	<2.75	U	6,000
Dichloromethane	0.69	<6.95	UB	<5.21	UB	<8.69	UB	<6.25	UB	<3.23	UB	<7.64	UB	<10.77	UB	1,765
Halocarbon 113	1.07	<1.07	U	<1.07	U	<1.07	U	<1.07	U	<1.07	U	9.96		<3.76	U	80,000
1,1,1-Trichloroethane	0.76	<0.76	U	<0.76	U	0.98	JC	2.13	JC	<0.76	U	81.84		27.28		115,000
Toluene	0.49	6.03		4.52		6.41		3.09	JC	4.14		2.94	JC	3.69	JC	2,000
Benzene	0.54	2.30	JC	1.21	JC	6.39		1.18	JC	2.33	JC	4.79		4.15		na
Trichloroethene	0.70	1.83	JC	0.91	JC	3.22	JC	<0.70	U	0.91	JC	<2.58	U	<2.47	U	6,000
Tetrachloroethene	1.02	<1.02	U	<1.02	U	<1.02	U	<1.02	U	<1.02	U	<3.80	U	7.46		na
Ethylbenzene	0.65	0.69	JC	1.04	JC	0.78	JC	<0.65	U	<0.65	U	<2.43	U	<2.30	U	4,000
m&p-Xylene	1.00	2.47	JC	4.78		2.78	JC	2.13	JC	1.39	JC	<3.69	U	<3.52	U	2,300(3)
o-Xylene	0.82	1.00	JC	1.52	JC	1.22	JC	<0.82	U	<0.82	U	<3.04	U	<2.91	U	2,300(3)
1,2,4-Trimethylbenzene	1.23	1.87	JC	2.36	JC	2.02	JC	<1.23	U	<1.23	U	<4.57	U	<4.33	U	1,000

Notes:
(1) not detected values are reported at detection limit and are shown with a < symbol
(2) na denotes not available
(3) value represents o, m, p, xylenes
MDL - denotes method detection limits
U = Non-detected at the stated limit.
UB = Non-detected at elevated reporting limit as a result of blank contamination.
JC = Estimated value; measured at less than ½ the low calibration standard.

TABLE 15
Summary of VOC Results May 14th Event [1]

Parameter	MDL (µg/m³)	Victoria Road Results (µg/m³)		Frederick Street Results (µg/m³)		Henry Street Results (µg/m³)		Kings Road Results (µg/m³)		Intercolonial Street Results (µg/m³)		DesBarres Street Results (µg/m³)		Ontario Ambient Air Quality 24-hour Criteria (µg/m³)
Dichlorodifluoromethane	0.71	1.77	JC, JP	0.88	JC	1.59	JC	1.27	JC	1.77	JC	<0.71	U	500,000
Chloroethane	0.24	<0.34	U	<0.24	U	0.50	JC	<0.24	U	<0.24	U	<0.24	U	na[2]
1,2-Dichloroethane	0.61	<0.85	U	<0.61	U	<0.61	U	0.85	JC	<0.61	U	<0.61	U	na
Trichlorofluoromethane	0.79	1.18	JC, JP	1.35	JC	1.52	JC	1.52	JC	1.46	JC	1.18	JC	6,000
Dichloromethane	0.69	<4.86	UB	<7.30	UB	<3.82	UB	<7.30	UB	<13.90	UB	<12.85	UB	1,765
Halocarbon 113	1.07	<1.53	U	1.53	JC	<1.07	U	<1.07	U	<1.07	U	<1.07	U	80,000
Toluene	0.49	1.54	JC, JP	1.43	JC	0.87	JC	1.24	JC	1.39	JC	1.43	JC	2,000
Benzene	0.54	0.80	JC, JP	0.64	JC	0.93	JC	0.83	JC	1.31	JC	3.83		na
Trichloroethene	0.70	<0.97	U	<0.70	U	1.50	JC	<0.70	U	1.02	JC	0.86	JC	6,000
1,2,4-Trichlorobenzene	1.19	2.67	JC, JP	1.48	JC	1.78	JC	<1.19	UJM	<1.19	UJM	<1.19	UJM	400

Notes:
(1) not detected values are reported at detection limit and are shown with a < symbol
(2) na denotes not available
MDL - denotes method detection limits
U = Non-detected at the reported limit.
UB = Non-detected with elevated reporting limit; detected in method blank or canister certification analysis.
UJM = Non-detected with estimated reporting limit; matrix spike analysis indicates potential low bias.
JC = Estimated value, measured at less than ½ the low calibration standard.
JP = Estimated value; pressure readings indicate potential for in-leakage of air during shipment.

TABLE 16
Summary of VOC Results May 28th Event [1]

Parameter	MDL (µg/m³)	Victoria Road Results (µg/m³)		Frederick Street Results (µg/m³)		Kings Road Results (µg/m³)		Intercolonial Street Results (µg/m³)		DesBarres Street Results (µg/m³)		Ontario Ambient Air Quality 24-hour Criteria (µg/m³)
Trichlorofluoromethane	0.79	2.02	JC	1.97	JC	2.13	JC	2.02	JC	2.75	JC,JS	6,000
Dichloromethane	0.69	<11.81	UB	<17.02	UB	<18.41	UB	<23.97	UB	<10.77	UB	1,765
Halocarbon 113	1.07	<1.07	U	1.99	JC	1.15	JC	1.92	JC	1.69	JC	80,000
1,1,1-Trichloroethane	0.76	1.31	JC	<0.76	U	<0.76	U	1.53	JC	<0.76	U	115,000
Toluene	0.49	4.14		10.93		7.16		23.26		7.54		2,000
Benzene	0.54	1.12	JC	1.50	JC	1.50	JC	2.84	JC	1.21	JC	na[2]
Trichloroethene	0.70	1.67	JC	1.13	JC	1.18	JC	10.21		1.02	JC	6,000
Ethylbenzene	0.65	<0.65	U	0.87	JC	<0.65	U	2.00	JC	<0.65	U	4,000
m&p-Xylene	1.00	1.65	JC	2.52	JC	1.74	JC	5.21		2.17	JC	2,300[3]
o-Xylene	0.82	<0.82	U	1.00	JC	0.87	JC	1.82	JC	0.96	JC	2,300[3]
1,2,4-Trimethylbenzene	1.23	1.38	JC	<1.23	U	1.72	JC	2.56	JC	1.57	JC	1,000

Notes:
(1) not detected values are reported at detection limit and are shown with a < symbol.
(2) na denotes not available.
(3) value represents o, m, p, xylenes
MDL - denotes method detection limits
U = Non-detected at the reported limit.
UB = Non-detected with elevated reporting limit; detected in method blank or canister certification analysis.
JS = Estimated value as a result of low internal standard recovery.
JC = Estimated value, measured at less than ½ the low calibration standard; instrument linearity not demonstrated.

Currently, there are no ambient air regulations or guidelines for Nova Scotia covering the VOC parameters. The Province of Ontario provides guidelines for some parameters identified in Tables 14 to 16 and these guidelines have been included for comparison with the measured concentrations. A review of results compared to the Ontario Air Quality Criteria indicates that all results are below the guideline values.

3.4 PROGRAM QA/QC

Refer to Appendix "B" for a copy of the May Data Validation Report.

The data generated for this program are supported by quality assurance/quality control measures and can be relied upon for program purposes. Accuracy, precision and completeness met or exceeded program objectives for most analyses. The uncertainties in measurements that exist in the data set for VOCs and metals are primarily reflections of the low levels of compounds present in the ambient air. VOC and metals, when detected, were essentially just above the laboratory method detection limit, and well below action levels. With very limited exceptions, the data, taking into consideration the qualifications applied from validation, may be used with confidence for air quality characterization.

The text for the May Data Validation Report details the reasons for all qualifications to data. Quantitative results may be qualified as estimated for a variety of reasons including: measurements below the demonstrated linear range of the instrument; high or low recoveries of surrogate compounds or matrix spike compounds (samples to which target compounds have been added); canister flow uncertainties; and changes in the pressure of a canister between the end of the sampling event and receipt at the lab. The bottom line is that the identification is reliable but the measured concentration has a degree of uncertainty to it. When possible, the text provided limits to this uncertainty; for example, if the surrogate recovery is low, the sample results are likely low to a comparable degree and low surrogate recovery probably indicates that the measured result represents only a portion of the actual air concentration. In many cases, however, it is not possible to establish clear limits for the uncertainty. The sample specific reasons for data qualification are summarized in the footnotes of the tables in Sections 3.1 to 3.3 and detailed in Appendix "B".

The following provides a summary of the data validation findings for the VOC, PAH and metals parameters.

3.4.1 VOCs

Most volatiles detected were at concentrations less than one half the low calibration standard and are qualified as estimated (JC) since the linearity of the instrument response cannot be assumed.

Results for dichloromethane (methylene chloride) have been qualified as non-detected with elevated reporting limits as a result of laboratory background for this common solvent (UB).

Field duplicate samples were collected at DesBarres Street on May 2nd. The DesBarres Street samples were also analyzed by Environment Canada. The DesBarres Street duplicates from May 2nd, 2002 were pressurized by PSC prior to analysis. Reporting limits for some analytes did not meet program objectives as a result.

The cantroller for the field duplicate set on May 28th, 2002 was damaged and became blocked so that inadequate sample volumes were collected.

Table 17 presents data for the replicate analyses of field duplicate samples by PSC and Environment Canada, with the calculated relative percent differences (RPDs).

TABLE 17
Field Duplicate Analyses by PSC and Environment Canada

	DesBarres Street May 2nd	DesBarres Street Field Duplicate May 2nd	PSC RPD	Environment Canada			RPD	
				KC M53	KC M19	EC RPD	EC/PSC	
	ppbv	ppbv		ppbv	ppbv		KC M53	KC M19
Dichlorodifluoromethane	0.81	<0.70		0.74	0.76	3%	9%	NC (2)
Chloromethane	<1.1	<1.0		1.95	0.92	72%	NC	NA (1)
Halocarbon 113	1.3	<0.49		1.06	0.44	83%	23%	NA
1,1,1-Trichloroethane	15.00	5.00	100%	15.99	5.85	93%	6%	16%
Toluene	0.78	0.98	23%	0.62	0.98	45%	23%	0%
Benzene	1.50	1.30	14%	1.66	1.48	11%	10%	13%
Tetrachloroethylene	<0.56	1.1		0.05	0.71	174%	NA	55%

Notes: (1) NA = Not applicable; PSC detection limit was greater than the amount reported by Environment Canada.
(2) NC = Not calculated; PSC detection limit was below amount reported by Environment Canada.

Results between PSC and Environment Canada agreed within 25% relative difference where both laboratories detected analytes. 1,1,1-Trichloroethane levels in the two canisters were, however, significantly different. Based on the agreement between PSC and Environment Canada, the difference is attributable to field activities or contamination prior to analysis rather than laboratory variances. Environment Canada detected chloromethane and dichlorodifluoromethane in one canister at concentrations slightly above PSC's reporting limit, but PSC did not report them. However, based on the levels this is not a significant variance.

3.4.2 PAHs

Naphthalene in several samples from May 2nd, 2002 was qualified as a result of low contamination in the method blank. All other method criteria for precision and accuracy were met for the remaining PAH analyses.

3.4.3 Metals

The method blanks and one field blank for the PM_{10} samples contained trace levels of various metals. Data were qualified accordingly.

4.0 SUMMARY OF REAL TIME MONITORING PERFORMED DURING THE REMOVAL OF THE COOLING GRIDS AND FIXED STATION RESULTS

The following section provides a summary of 24-hour sampling results for sampling locations located near the Coke Ovens site (Victoria Road and Frederick Street) and results for onsite real-time PM_{10} monitoring performed during the demolition of the removal of the Cooling Grids, located on the Coke Ovens site. Sampling over 24-hour periods as per the NAPS schedule was performed from midnight to midnight on May 2nd, 14th and 28th. Real-time monitoring for PM_{10} and VOCs was performed on May 28th and 29th during the workday hours (typically 7:00 am until 7:00 pm). All results were compared to Interim Separation Zone Criteria developed in the fall of 2000 for use during the decommissioning of surface structures.

Real-time monitoring for PM_{10} and VOCs was performed with a portable TSI DustTrak and MINIRAE Photoionization Detector (PID), respectively, and consisted of an AMEC employee obtaining measurements at fixed upwind and downwind perimeter locations. Refer to Figure 8 for the monitoring locations. Daily monitoring activities typically involved monitoring at three downwind locations and one upwind location for durations ranging from five minutes to one hour. All exceedances (if any) to the 1-hour site action level of 43 $\mu g/m^3$ for PM_{10} or the OSHA time weighted average of 15,950 $\mu g/m^3$ for benzene (it is assumed that all of the PID reading is that of benzene) were reported to the PMC. The upwind and downwind locations were monitored at least once every two hours, depending on prevailing winds, location of demolition activities, and level of activity. If wind conditions had changed over the day, monitoring activities were shifted to the locations that were directly downwind of the demolition activities.

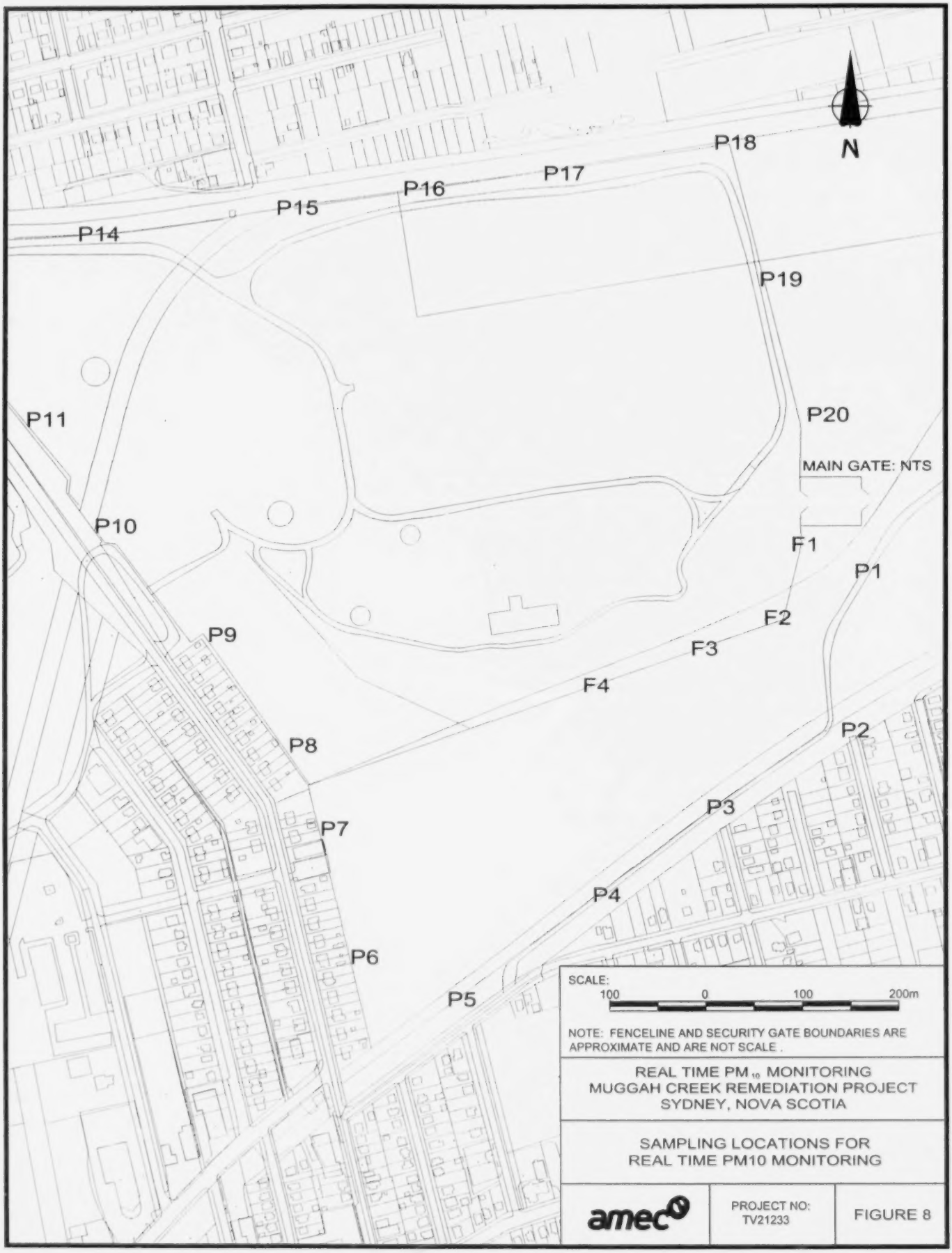
4.1 SUMMARY OF WEATHER PARAMETERS DURING REAL-TIME MONITORING

Table 18 provides a summary of weather parameter data obtained from the Coke Ovens project weather station, for each workday (7:00 am – 7:00 pm) on May 28th and 29th.

TABLE 18
Summary of Coke Ovens Project Weather Station During the Removal of the Cooling Grids

Wind Direction During Monitoring Period	% Frequency	
	May 28th	May 29th
N	-	-
NNE	-	-
NE	8.3	-
ENE	-	-
E	-	-
ESE	-	-
SE	-	58.5
SSE	-	8.3
S	-	-
SSW	-	8.3
SW	8.3	-
WSW	-	8.3
W	8.3	8.3
WNW	33.3	-
NW	16.8	-
NNW	25.0	8.3
Calm	-	-
Avg. Wind speed (km/hr) [m/s]	23.9 [6.6]	20.7 [5.8]
Avg. Temperature (°C)	18.0	19.4
Minimum Temperature (°C)	12.7	7.2
Maximum Temperature (°C)	20.7	22.4

Note: (1) NA denotes not available.


N
P18
P17
P16
P15
P14
P19
P11
P20
MAIN GATE: NTS
P10
F1
P1
F2
P9
F3
F4
P2
P8
P3
P7
P4
P6
P5
SCALE:
100 0 100 200m
NOTE: FENCELINE AND SECURITY GATE BOUNDARIES ARE APPROXIMATE AND ARE NOT SCALE .
REAL TIME PM10 MONITORING
MUGGAH CREEK REMEDIATION PROJECT
SYDNEY, NOVA SCOTIA
SAMPLING LOCATIONS FOR
REAL TIME PM10 MONITORING
amec
PROJECT NO:
TV21233
FIGURE 8

4.2 24-HOUR NAPS SAMPLING EVENTS RESULTS FOR LOCATIONS AROUND THE COKE OVENS SITE

Table 19 provides a summary of 24-hour sampling results for the Victoria Road and Frederick Street locations compared to Interim Separation Zone Criteria for sampling performed on days falling on the NAPS schedule.

TABLE 19
Summary of Victoria Road and Frederick Street 24-hour Monitoring Results Compared to the Interim Separation Zone Criteria

Parameter	May 2nd Event (µg/m³)				May 14th Event (µg/m³)				May 28th Event (µg/m³)				Interim Separation Zone 24-hour Criteria (µg/m³)
	Victoria Road		Frederick Street		Victoria Road		Frederick Street		Victoria Road		Frederick Street		
Benzene	2.3	JC	1.21	JC	0.8	JC, JP	0.64	JC	1.12	JC	1.5	JC	7 (1)
Toluene	6.03		4.52		1.54	JC, JP	1.43	JC	4.14		10.93		760
Ethylbenzene	0.69	JC	1.04	JC	<0.91	U	<0.65	U	<0.65	U	0.87	JC	200
Xylene	3.47	JC	6.30	JC	<1.39	U	<1.08	U	2.06	JC, U	3.52	JC	36
Dichloromethane	<6.95	UB	<5.21	UB	<4.86	UB	<7.30	UB	<11.81	UB	<17.02	UB	200 (1)
Benzo(a)pyrene	<0.14	U	<0.14	U	<0.14	U	<0.14	U	<0.14	U	<0.14	U	22,400
Naphthalene	0.71	UB	2.8	UB	0.51	UB	0.42	UB	4.9		0.86		3,000
PM_{10}	12.2		11.3		6.1		14.7		14.3		169		25

Notes: not detected values are reported at detection limit and are shown with a < symbol.
(1) Periodic exceedances of 7.0 µg/m³ as high as 86.4 µg/m³ for benzene and periodic exceedances of 200 µg/m³ as high as 2000 µg/m³ for dichloromethane are considered acceptable based on short-term exposure risk to human health, as indicated in the Separation Zone Study report. Exceedances of 7.0 µg/m³ and 200 µg/m³ will be evaluated in light of previous and subsequent concentrations.
U = Non-detected at the reported limit.
JC = Estimated value, measured at less than ½ the low calibration standard; instrument linearity not demonstrated.
UB = Non-detected with elevated reporting limit; detected in method blank or canister certification analysis.
JP = Estimated value; pressure readings indicate potential for in-leakage of air during shipment.

With the exception of the PM_{10} parameter on May 28th, the analytical results indicate there are no other exceedances to the Interim Separation Zone Criteria for the Victoria Road and Frederick Street locations.

On May 28th there was a PM_{10} result of 169 µg/m³ obtained at the Frederick Street location, exceeding the Interim Separation Zone Criterion for PM_{10} of 25 µg/m³. Although the Cooling Grids were being removed from the Coke Ovens site, a review of wind conditions along with real-time PM10 results from monitoring near the removal activities indicates that it is unlikely the exceedance was due to activities on the Coke Ovens site. Weather conditions on May 28th included winds from the WNW (41.7%) blowing from the Whitney Pier area towards the sampling location, at an average wind speed of 23.8 km/hr. An average temperature of 15.2 °C was recorded from the Coke Ovens project weather station. There was no precipitation on May 28th.

Much of the lower end of Frederick Street does not have an asphalt cover, only exposed gravel and dirt. During the May 28th event heavy commercial truck traffic, unrelated to the Muggah Creek project, was observed on Frederick Street. Based on a review of wind conditions (blowing from WNW), along with the proximity of these exposed gravel areas to the Frederick Street sampling location, it is likely that the dust generated from truck traffic on the lower end of Frederick Street contributed greatly to the PM_{10} sample.

A review of the May 28th data compared with the data from the May 2nd and May 14th events reveals that the remaining detected compounds on May 28th were similar to the earlier May

results, with the exception of a higher naphthalene concentration of 4.9 μg/m^3 on May 28th at the Victoria Road location and slightly higher toluene concentration of 10.93 μg/m^3 at the Frederick Street location. These values are well below the referenced guidelines.

4.3 SUMMARY OF ONSITE REAL-TIME MONITORING RESULTS

Table 20 provides a summary of the highest 1-hour real-time PM_{10} results obtained at the perimeter of the Coke Ovens site during the by-products building demolition.

TABLE 20
Summary of Highest 1-Hour Onsite Real-time PM_{10} Results during the Removal of the Cooling Grids

Date	Parameter	PM_{10}		OSHA 8-Hour TWA [1] for Benzene (μg/m^3)	1-Hour PM_{10} Action Level (μg/m^3) [2]
		Highest 1-hour Results (μg/m^3)	Daily Time Weighted Average (μg/m^3)		
May 28th	PM_{10}	38	28	na[3]	43
	VOC	Not detected	Not detected	15,950	na
May 29th	PM_{10}	34 [4]	34 [4]	na	43
	VOC	Not detected	Not detected	15,950	na

Note: (1) TWA = Time Weighted Average
(2) 1-hour Action Level is developed from the Interim Separation Zone Criterion of 25 μg/m^3 for PM_{10} for a 24-hour averaging period.
(3) na denotes not applicable.
(4) Time weighted average based on the daily total monitoring time of 55 minutes.

A comparison of the 1-hour PM_{10} results with the 1-hour Action Level of 43 μg/m^3 indicates that there are no exceedances to the Action Level established for the Coke Ovens site. VOCs were not detected by PID monitoring techniques during the removal of the Cooling Grids.

5.0 YEAR TO DATE AVERAGES, MAXIMUMS, AND MINIMUMS

This section provides a summary of year 2002 to date averages, maximums and minimums. Refer to Tables 21 to 24 for a summary of the PM_{10}/metals, $PM_{2.5}$/metals, PAH and VOC to date results. It is noted that averages were not calculated for sample sets where all results were reported as below the method detection limit. For sample sets where at least one value in the sample set is reported as above the method detection limit, the values below the method detection limit are used in the calculation of averages by inputting values at half the reported method detection limit. It is further noted that where averages are reported in instances where the maximum value is reported as below the method detection limit on the tables, means that there was at least one value reported as being detected but the value(s) happens to be below the maximum reported detection limit on the tables.

TABLE 21
Summary of Year to Date PM_{10}/Metals Results (1)

Parameter	Victoria Road			Frederick Street			DesBarres		
	Average ($\mu g/m^3$)	Minimum Value ($\mu g/m^3$)	Maximum Value ($\mu g/m^3$)	Average ($\mu g/m^3$)	Minimum Value ($\mu g/m^3$)	Maximum Value ($\mu g/m^3$)	Average ($\mu g/m^3$)	Minimum Value ($\mu g/m^3$)	Maximum Value ($\mu g/m^3$)
PM_{10}	8.8	3.8	15.7	21.1	1.9	169.0	10.3	1.3	19.2
Aluminum	0.1	<0.1	0.4	0.3	<0.1	3.0	0.1	<0.1	0.2
Antimony	--	<0.001	<0.001	<0.001	<0.001	<0.001	--	<0.001	<0.001
Barium	--	<0.01	<0.01	0.01	<0.01	0.02	--	<0.01	<0.01
Beryllium	--	<0.001	<0.001	--	<0.001	<0.001	--	<0.001	<0.001
Boron	--	<0.1	<0.1	--	<0.1	<0.1	--	<0.1	<0.1
Cadmium	--	<0.001	<0.001	--	<0.001	<0.001	--	<0.001	<0.001
Chromium	--	<0.001	<0.001	0.001	<0.001	0.004	--	<0.001	<0.001
Cobalt	--	<0.001	<0.001	0.001	<0.001	0.002	0.001	<0.001	0.002
Calcium	0.3	<0.3	0.7	0.3	<0.4	1.8	0.3	<0.4	1.1
Copper	0.02	<0.01	0.07	0.03	<0.01	0.08	0.03	<0.01	0.09
Iron	0.2	<0.1	0.6	0.5	<0.1	5.0	0.1	<0.1	0.4
Lead	0.003	<0.002	<0.009	0.003	<0.001	0.010	0.003	<0.001	0.007
Lithium	--	<0.001	<0.001	0.001	<0.001	0.004	--	<0.001	<0.001
Manganese	0.01	<0.01	0.02	0.03	<0.01	0.25	0.01	<0.01	0.02
Molybdenum	--	<0.01	<0.01	--	<0.01	<0.01	--	<0.01	<0.01
Nickel	0.002	<0.003	0.006	<0.002	<0.003	<0.014	0.002	<0.003	<0.008
Silver	0.001	<0.001	0.002	0.001	<0.001	<0.006	0.001	<0.001	0.002
Sodium	0.4	<0.3	<1.5	0.3	<0.4	<1.5	0.4	<0.4	<1.5
Thallium	--	<0.001	<0.001	--	<0.001	<0.001	--	<0.001	<0.001
Tin	--	<0.01	<0.01	--	<0.01	<0.01	--	<0.01	<0.01
Uranium	--	<0.001	<0.001	--	<0.001	<0.001	--	<0.001	<0.001
Vanadium	0.001	<0.001	0.002	0.001	<0.001	0.010	0.001	<0.001	0.003
Zinc	--	<0.1	<0.1	--	<0.1	<0.1	--	<0.1	<0.1
Strontium	--	<0.003	<0.003	<0.002	<0.003	<0.003	--	<0.003	<0.004
Magnesium	0.1	<0.1	0.3	0.3	<0.1	2.1	0.1	<0.1	0.2
Potassium	<0.2	<0.3	<0.6	0.2	<0.4	<0.6	0.2	<0.4	<0.5
Sulphur	--	<2.1	<2.3	--	<2.2	<2.5	--	<2.2	<2.6
Arsenic	0.002	<0.001	0.006	0.003	<0.001	0.010	0.004	<0.001	0.012
Selenium	--	<0.001	<0.001	--	<0.001	<0.001	--	<0.001	<0.001
Mercury	--	<0.0001	<0.0001	--	<0.0001	<0.0001	--	<0.0001	<0.0001

Note: (1) not detected values are reported at detection limit and are shown with a < symbol.
(2) -- not applicable.

amec

TABLE 22
Summary of Year to Date $PM_{2.5}$/Metals Results [1]

Parameter	Henry Street			Kings Road			Intercolonial Street		
	Average ($\mu g/m^3$)	Minimum Value ($\mu g/m^3$)	Maximum Value ($\mu g/m^3$)	Average ($\mu g/m^3$)	Minimum Value ($\mu g/m^3$)	Maximum Value ($\mu g/m^3$)	Average ($\mu g/m^3$)	Minimum Value ($\mu g/m^3$)	Maximum Value ($\mu g/m^3$)
$PM_{2.5}$	--	<20.8	<20.8	11.4	<20.8	24.9	11.5	<20.8	24.9
Aluminum	--	<0.83	<0.83	--	<0.83	<0.83	0.61	<0.83	2.91
Antimony	--	<0.0166	<0.0166	0.0347	<0.0083	0.3784	0.0179	<0.0083	0.1331
Barium	<0.0083	<0.0166	<0.0166	--	<0.0166	<0.0166	--	<0.0166	<0.0166
Beryllium	--	<0.0208	<0.0208	--	<0.0208	<0.0208	--	<0.0208	<0.0208
Boron	--	<4.2	<4.2	--	<4.2	<4.2	--	<4.2	<4.2
Cadmium	--	<0.0125	<0.0125	--	<0.0125	<0.0125	--	<0.0125	<0.0125
Chromium	--	<0.083	<0.083	--	<0.083	<0.083	--	<0.083	<0.083
Cobalt	--	<0.042	<0.042	--	<0.042	<0.042	--	<0.042	<0.042
Calcium	--	<4.2	<4.2	--	<4.2	<4.2	--	<4.2	<4.2
Copper	--	<0.083	<0.083	--	<0.083	<0.083	0.045	<0.042	0.083
Iron	--	<4.2	<4.2	--	<4.2	<4.2	--	<4.2	<4.2
Lead	--	<0.042	<0.042	0.025	<0.021	0.083	--	<0.042	<0.042
Lithium	--	<0.042	<0.042	--	<0.042	<0.042	--	<0.042	<0.042
Manganese	--	<0.042	<0.166	--	<0.042	<0.166	--	<0.042	<0.166
Molybdenum	--	<0.166	<0.166	--	<0.166	<0.166	--	<0.166	<0.166
Nickel	--	<0.125	<0.125	--	<0.125	<0.125	--	<0.125	<0.125
Silver	0.027	<0.008	<0.083	0.028	<0.008	0.104	0.024	<0.004	<0.083
Sodium	--	<12.5	<12.5	--	<12.5	<12.5	--	<12.5	<12.5
Thallium	--	<0.0333	<0.0333	--	<0.0333	<0.0333	--	<0.0333	<0.0333
Tin	--	<0.83	<0.83	--	<0.83	<0.83	--	<0.83	<0.83
Uranium	--	<0.00624	<0.00624	0.00361	<0.00624	0.00998	--	<0.00624	<0.00624
Vanadium	--	<0.083	<0.083	--	<0.083	<0.083	--	<0.083	<0.083
Zinc	0.262	<0.083	2.661	0.113	<0.042	0.707	--	<0.083	<0.083
Strontium	--	<0.083	<0.083	--	<0.083	<0.083	--	<0.083	<0.083
Magnesium	--	<2.49	<2.49	--	<2.49	<2.49	--	<2.49	<2.49
Potassium	--	<24.9	<24.9	--	<24.9	<24.9	--	<24.9	<24.9
Sulphur	--	<153.8	<153.8	--	<153.8	<153.8	--	<153.8	<153.8
Arsenic	--	<0.0249	<0.0249	--	<0.0249	<0.0249	--	<0.0249	<0.0249
Selenium	--	<0.042	<0.042	--	<0.042	<0.042	--	<0.042	<0.042
Mercury	--	<0.0042	<0.0042	--	<0.0042	<0.0042	--	<0.0042	<0.0042

Note: (1) not detected values are reported at detection limit and are shown with a < symbol.
(2) -- not applicable.

TABLE 23
Summary of Year to Date PAH Results [1]

Parameter	Victoria Road			Frederick Street			Henry Street			Kings Road			Intercolonial Street			DesBarres Street		
	Average (ng/m^3)	Minimum Value (ng/m^3)	Maximum Value (ng/m^3)	Average (ng/m^3)	Minimum Value (ng/m^3)	Maximum Value (ng/m^3)	Average (ng/m^3)	Minimum Value (ng/m^3)	Maximum Value (ng/m^3)	Average (ng/m^3)	Minimum Value (ng/m^3)	Maximum Value (ng/m^3)	Average (ng/m^3)	Minimum Value (ng/m^3)	Maximum Value (ng/m^3)	Average (ng/m^3)	Minimum Value (ng/m^3)	Maximum Value (ng/m^3)
Naphthalene	2.5	0.48	15.4	1.8	0.42	9.99	2.2	0.39	11.53	1.34	0.37	5.14	1.81	0.64	5.36	1.89	0.31	10.57
Acenaphthylene	0.71	0.21	1.70	0.54	0.14	3.33	1.25	0.40	3.94	0.63	<0.07	1.63	0.62	0.28	1.51	0.75	0.31	2.57
Acenaphthene	0.45	<0.07	1.94	0.89	0.07	6.66	0.57	<0.07	1.65	0.30	<0.07	0.55	0.90	0.26	2.55	0.65	<0.07	1.80
Fluorene	1.9	0.72	4.3	1.59	0.83	3.33	2.6	1.22	5.34	1.51	0.44	2.85	2.6	0.95	4.8	2.3	1.21	5.43
Phenanthrene	4.6	1.71	8.6	4.2	2.07	9.73	8.6	3.38	17.4	3.7	1.01	6.85	6.6	1.88	17.0	5.8	2.73	13.72
Anthracene	0.67	0.28	1.38	0.66	0.22	2.08	1.8	0.49	3.30	0.63	0.07	1.74	1.07	0.40	1.91	1.05	0.40	2.51
Fluoranthene	1.00	0.50	2.22	1.08	0.63	2.82	2.7	0.95	6.3	0.98	0.21	2.16	1.13	0.24	2.81	1.39	0.79	3.71
Pyrene	0.88	0.39	2.30	0.84	0.36	2.82	2.8	0.92	6.9	0.90	0.17	2.11	1.14	0.42	2.81	1.20	0.61	3.71
Benzo(a)anthracene	0.13	<0.07	0.60	0.12	<0.06	0.67	0.42	<0.07	1.60	0.15	<0.07	0.57	0.13	<0.06	0.71	0.21	<0.07	1.20
Chrysene	0.25	<0.07	0.81	0.23	<0.06	0.95	0.76	0.18	1.91	0.27	<0.07	0.91	0.26	<0.06	1.05	0.38	<0.08	1.46
Benzo Fluoranthene	0.29	<0.01	1.12	0.27	<0.01	1.28	0.96	<0.16	2.73	0.34	<0.02	1.26	0.31	<0.13	1.33	0.42	<0.01	1.89
Benzo(e)pyrene	0.11	<0.07	0.44	0.11	<0.06	0.44	0.35	<0.07	1.10	0.13	<0.07	0.46	0.10	<0.06	0.48	0.15	<0.07	0.86
Indeno(1,2,3-cd)pyrene	0.11	<0.07	0.47	0.11	<0.06	0.49	0.34	<0.07	1.10	0.14	<0.07	0.46	0.11	<0.06	0.51	0.14	<0.06	0.71
Dibenzo(a,h)anthracene	—	<0.07	<0.07	—	<0.06	<0.07	0.08	<0.07	0.20	—	<0.07	<0.08	—	<0.06	<0.08	0.08	<0.06	0.14
Benzo(g,h,i)perylene	0.12	<0.07	0.52	0.11	<0.06	0.51	0.40	<0.07	1.10	0.15	<0.07	0.49	0.12	<0.06	0.54	0.15	<0.07	0.77
Total PAH [2]	13.8	NC	NC	12.6	NC	NC	25.9	NC	NC	11.2	NC	NC	17.0	NC	NC	16.6	NC	NC

Note: (1) not detected values are reported at detection limit and are shown with a < symbol.
(2) Total PAH is the sum of all reported values, including PAHs with values reported as non-detect, using values at half the detection limit.
NC = Not Calculated because of the range in reported method detection limit.

TABLE 24
Summary of Year to Date VOC Results (1)

Parameter	Victoria Road			Frederick Street			Henry Street			Kings Road			Intercolonial Street			DesBarres Street		
	Average ($\mu g/m^3$)	Minimum Value ($\mu g/m^3$)	Maximum Value ($\mu g/m^3$)	Average ($\mu g/m^3$)	Minimum Value ($\mu g/m^3$)	Maximum Value ($\mu g/m^3$)	Average ($\mu g/m^3$)	Minimum Value ($\mu g/m^3$)	Maximum Value ($\mu g/m^3$)	Average ($\mu g/m^3$)	Minimum Value ($\mu g/m^3$)	Maximum Value ($\mu g/m^3$)	Average ($\mu g/m^3$)	Minimum Value ($\mu g/m^3$)	Maximum Value ($\mu g/m^3$)	Average ($\mu g/m^3$)	Minimum Value ($\mu g/m^3$)	Maximum Value ($\mu g/m^3$)
Dichlorodifluoromethane	0.82	<0.71	1.77	0.86	<0.71	2.02	0.79	<0.71	1.98	0.94	<0.71	3.39	0.73	<0.71	1.77	0.89	<0.71	2.86
Chloromethane	0.48	<0.60	<1.45	0.58	<0.60	2.27	0.66	<0.60	2.27	0.62	<0.60	<1.73	0.63	<0.60	1.24	0.67	<0.6	<2.3
Halocarbon 114	--	<1.19	<2.87	--	<1.19	<2.59	--	<1.19	<3.22	--	<1.19	<3.43	--	<1.19	<2.03	--	<1.19	<4.40
Vinyl chloride	--	<0.20	<0.49	--	<0.20	<0.46	--	<0.20	<0.56	--	<0.20	<0.59	--	<0.20	<0.36	--	<0.20	<0.77
Chloroethane	--	<0.24	<0.58	--	<0.24	<0.53	0.16	<0.24	<0.58	--	<0.24	<0.69	0.18	<0.24	0.63	--	<0.24	<0.87
1,2-Dichloroethane	--	<0.61	<1.46	--	<0.61	<1.34	--	<0.61	<1.66	0.40	<0.61	<1.78	--	<0.61	<1.05	--	<0.61	<2.27
Bromomethane	--	<0.35	<0.85	--	<0.35	<0.78	--	<0.35	<0.85	--	<0.35	<1.01	--	<0.35	<0.58	--	<0.35	<1.28
Trichlorofluoromethane	1.74	1.18	2.42	1.73	<0.79	2.47	1.70	<0.79	3.03	1.57	<0.79	<2.30	2.10	<1.35	6.18	1.92	1.18	2.98
1,1-Dichloroethene	--	<0.75	<1.82	--	<0.75	<1.67	--	<0.75	<2.02	--	<0.75	<2.18	--	<0.75	4.36	--	<0.75	<2.78
cis-1,1-Dichloroethene	--	<0.56	<1.35	--	<0.56	<1.23	--	<0.56	<1.51	--	<0.56	<1.63	--	<0.56	<0.95	--	<0.56	<2.06
1,1-Dichloroethane	--	<0.69	<1.66	--	<0.69	<1.50	--	<0.69	<1.86	--	<0.69	<1.98	--	<0.69	<1.17	--	<0.69	<2.55
1,2-Dichloropropane	--	<0.69	<1.66	--	<0.69	<1.52	--	<0.69	<1.89	--	<0.69	<2.03	--	<0.69	<1.20	--	<0.69	<2.59
Dichloromethane	--	<1.7	<132.0	4.4	<1.1	<20.8	6.7	<1.7	<52.1	11.8	<1.1	<52.1	8.1	<1.5	<45.2	14.4	<1.8	66.0
Chloroform	--	<0.73	<1.76	--	<0.73	<1.61	--	<0.73	<2.00	--	<0.73	<2.15	--	<0.73	<1.27	--	<0.73	<2.73
1,1,2,2-Tetrachloroethane	--	<1.51	<3.64	--	<1.51	<3.30	--	<1.51	<4.05	--	<1.51	<4.39	--	<1.51	<2.54	--	<1.51	<5.56
Halocarbon 113	0.82	<1.07	<2.61	0.96	<1.07	2.68	0.80	<1.07	<2.91	0.89	<1.07	<3.14	2.11	<1.07	10.73	2.9	<1.1	16.1
1,1,1-Trichloroethane	0.68	<0.76	1.86	0.59	<0.76	<1.69	0.54	<0.76	<2.07	0.58	<0.76	<2.24	4.73	<0.76	54.56	6.7	<0.8	81.8
1,1,2-Trichloroethane	--	<0.65	<1.58	--	<0.65	<1.42	--	<0.65	<1.75	--	<0.65	<1.91	--	<0.65	<1.09	--	<0.65	<2.40
Toluene	4.3	1.5	8.7	5.7	0.6	36.9	3.0	<0.8	6.4	3.2	0.8	7.2	5.1	1.2	23.4	4.9	<0.8	12.1
Benzene	0.99	<0.54	2.30	0.74	<0.54	1.50	1.4	<0.5	6.4	1.57	<0.54	5.43	1.40	<0.54	2.84	1.9	<0.5	5.8
cis-1,2-Dichloropropene	--	<0.64	<1.54	--	<0.64	<1.41	--	<0.64	<1.72	--	<0.64	<1.86	--	<0.64	<1.09	--	<0.64	<2.36
trans-1,3-Dichloropropene	--	<0.50	<1.18	--	<0.50	<1.09	--	<0.50	<1.36	--	<0.50	<1.45	--	<0.50	<0.86	--	0.50	<1.86
Trichloroethene	1.55	<0.70	6.99	1.13	<0.70	3.28	1.64	<0.70	6.45	1.15	<0.70	2.96	2.1	<0.7	10.2	1.38	<0.70	4.62
Tetrachloroethene	--	<1.02	<2.44	--	<1.02	<2.24	--	<1.02	<2.78	--	<1.02	2.98	--	<1.02	<1.76	--	<1.02	<3.80
Carbon tetrachloride	--	<0.94	<2.26	--	<0.94	<2.08	--	<0.94	<2.58	--	<0.94	<2.77	--	0.94	<1.64	--	<0.94	<3.52
Ethylene dibromide	--	<1.15	<2.77	--	<1.15	<2.54	--	<1.15	<3.15	--	<1.15	<3.38	--	1.15	<2.00	--	<1.15	<4.31
Ethylbenzene	0.51	<0.65	1.56	0.45	<0.65	<1.43	0.49	<0.65	<1.78	--	<0.65	<1.91	0.53	<0.65	2.00	0.45	<0.65	<2.43
m&p-Xylene	1.70	<1.00	5.21	1.3	<1.0	4.8	1.21	<1.00	4.12	1.09	<1.00	<2.91	1.4	<1.0	5.2	1.34	<1.00	<3.69
o-Xylene	0.66	<0.82	2.04	0.58	<0.82	<1.82	0.64	<0.82	<2.21	0.52	<0.82	<2.39	0.60	<0.82	1.82	0.62	<0.82	<3.04
1,3,5-Trimethylbenzene	0.82	<1.28	<3.05	--	<1.28	<2.80	--	<1.28	<3.44	0.86	<1.28	<3.69	--	<1.28	<2.16	--	<1.28	<4.72
1,2,4-Trimethylbenzene	1.72	<1.23	5.41	0.96	<1.23	<2.70	1.15	<1.23	3.54	0.88	<1.23	<3.59	1.03	<1.23	2.56	1.17	<1.23	<4.57
1,3-Dichlorobenzene	--	<0.90	<3.61	--	<0.75	<3.31	--	<0.90	<4.09	--	<0.90	<4.39	--	<0.90	<2.59	--	<0.90	<5.59
1,4-Dichlorobenzene	--	<0.90	<4.21	--	<0.90	<3.85	1.09	<0.90	<4.69	--	<0.90	<5.05	--	<0.90	<2.95	--	<0.9	<6.6
1,2-Dichlorobenzene	--	<0.90	<4.21	--	<0.90	<3.85	--	<0.90	<4.69	--	<0.90	<5.05	--	<0.90	<2.95	--	<0.9	<6.6
1,2,4-Trichlorobenzene	0.83	<1.11	<2.82	0.71	<1.11	<2.60	0.77	<1.11	<3.19	--	<1.11	<3.41	--	<1.11	<2.00	--	<1.11	<4.38
Hexachlorobutadiene	--	<2.45	<6.43	--	<2.45	<7.79	--	<2.45	<9.49	--	<2.45	<10.24	--	<2.45	<5.97	--	<2.4	<12.8
Chlorobenzene	--	<0.69	<1.66	--	<0.69	<1.52	--	<0.69	<1.89	--	<0.69	<2.03	--	<0.69	<1.20	--	<0.69	<2.58
Styrene	--	<1.1	<20.4	--	<1.11	<18.74	--	<1.11	<23.00	--	<1.11	<24.71	--	<1.11	<14.48	--	<1.1	<31.5

Note: (1) not detected values are reported at detection limit and are shown with a < symbol.
(2) -- not applicable.

6.0 CONCLUSIONS

With the exception of the PM_{10} result at the Frederick Street location for May 28th, a comparison of the May 2nd, 14th and 28th $PM_{2.5}$, PM_{10}, PAH and VOC 24-hour results for the fixed sampling locations with available regulatory criteria indicates that there were no exceedances to available 24-hour criteria for the monitoring performed during the month of May.

On May 28th, there was an exceedance (169 $\mu g/m^3$) at the Frederick Street location to the PM_{10} Ontario MOE 24-hour AAQC of 50 $\mu g/m^3$. Weather conditions on May 28th included winds from the WNW (41.7%) blowing from the Whitney Pier area towards the sampling location.

Although the Cooling Grids were being removed from the Coke Ovens site, a review of wind conditions along with real time PM10 results from monitoring near the removal activities indicates that it is unlikely the exceedance was due to activities on the Coke Ovens site. During the May 28th event AMEC field staff noticed that there was heavy commercial truck traffic on Frederick Street. Based on a review of wind conditions, along with the proximity of these exposed gravel areas to the Frederick Street sampling location, it is likely that the dust generated from truck traffic on the lower end of Frederick Street contributed greatly to the PM_{10} sample.

A review of real-time results obtained during the removal of the Cooling Grids (May 28th and 29th) indicated that there were no exceedances to the 1-hour Action Level developed for the project. VOCs were not detected using a PID instrument during removal activities.

A comparison of the 24-hour results for the NAPS event occurring when demolition activities were being performed on the Coke Ovens site with available regulatory criteria and standards indicate that impacts (as defined by the criteria) to the surrounding area from the demolition activities were not evident.

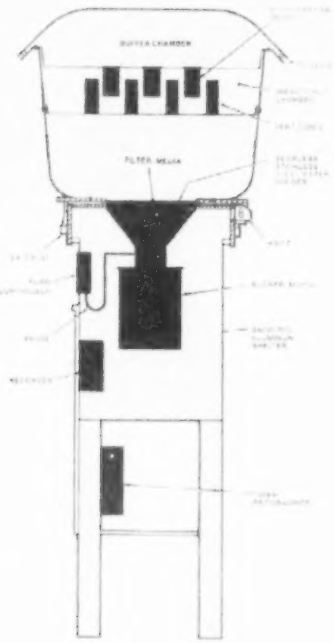
APPENDIX A

Sampling Equipment and Procedure Description

PM_{10} Units

Air sampling for PM_{10} is performed with a high volume sampler. Refer to Figure A1 for a sketch of the PM_{10} unit. The sampler consists of a size selective inlet, a filter holder, an air mover, a flow controller, and a timer.

The unit works by drawing air into a size selective inlet at a flow rate, which is typically 40 ft^3/min. Particles with aerodynamic diameters less than the cut point (less than 10 microns in diameter) are collected by the filter. The mass of the particles is determined by the difference in filter weights prior to and after sampling. The concentration of suspended particulate matter in the designated size range is calculated by dividing the weight gain of the filter by the volume of air sampled.



Electronic flow controller in PM10 sampler. (Courtesy of Graseby-Andersen, Atlanta, Georgia.)

Figure A1

The main steps involved in sampling include the following:

1. Filter preparation by the Environmental Services Laboratory (ESL).
2. Installing the filter in the high volume sampler.
3. Setting the samplers timer so that it will turn on at midnight of the day of setup. Checking the flow for a five-minute period to ensure the high volume sampler is operating properly. Inspecting the filter during the five-minute operation to ensure that the filter is installed correctly and is not damaged.
4. Performing periodic flow checks during the 24 hour sampling period to ensure the sampler is operating properly.
5. The sampler shuts off automatically after 24 hours (midnight) and AMEC collects the filter the following morning and transports it to ESL for PM_{10} and metals analysis. AMEC uses the field pressure measurements and laboratory results to calculate a concentration, which is reported in the monthly reports.

$PM_{2.5}$ Units

Air sampling for $PM_{2.5}$ in air is performed with a low volume sampler. Refer to Figure A2 for a sketch of the $PM_{2.5}$ unit. The sampler consists of a size selective inlet, a filter holder, an air mover, a flow controller, and a timer.

The unit works by drawing air into a size selective inlet at a flow rate, which is typically 16.7 L/min. Particles with aerodynamic diameters less than the cut point (less than 2.5 microns) are collected by the filter. The mass of the particles is determined by the difference in filter weights prior to and after sampling. The concentration of suspended particulate matter in the designated size range is calculated by dividing the weight gain of the filter by the volume of air sampled.

Figure A2

The main steps involved in sampling include the following:

1. Filter preparation by ESL.
2. Installing the filter in the low volume sampler
3. Setting the samplers timer so that it will turn on at midnight of the day of setup. Checking the flow for a five-minute period to ensure the low volume sampler is operating properly.
4. Performing periodic flow checks during the 24 hour sampling period to ensure the sampler is operating properly.
5. The sampler shuts off automatically after 24 hours (midnight) and AMEC collects the filter the following morning and transports it to ESL for $PM_{2.5}$ and metals analysis. AMEC uses the field pressure measurements and laboratory results to calculate a concentration, which is reported in the monthly reports.

PAH Units

Air sampling for PAHs in air is performed with a high volume sampler. Refer to Figure A3 for a sketch of the PAH unit. The sampler consists of a module containing a filter holder and polyurethane foam (PUF) backup media, an air mover, a flow controller, and a timer.

The unit works by drawing air over a module at a flow rate, which is typically 7.9 ft^3/min. PAH particulate matter is captured on a filter at the front of the PUF module, and the vapor phase of the PAHs is captured in the PUF foam backup.

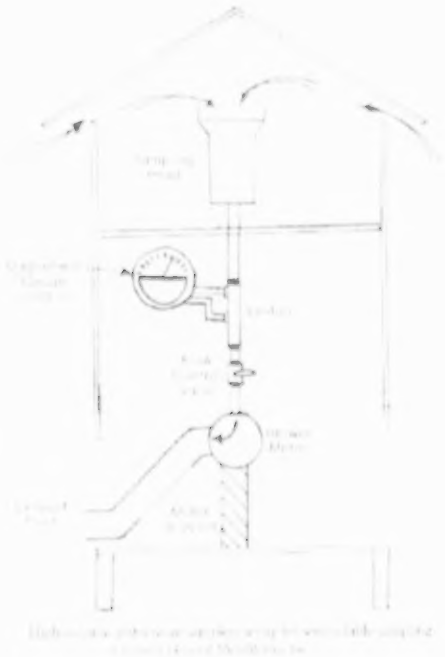


Figure A3

The main steps involved in sampling include the following:

1. PUF module preparation by the ESL.
2. Installing the module in the high volume sampler
3. Setting the samplers timer so that it will turn on at midnight of the day of setup. Checking the flow for a five-minute period to ensure the low volume sampler is operating properly.
4. Performing periodic flow checks during the 24 hour sampling period to ensure the sampler is operating properly.
5. The sampler shuts off automatically after 24 hours (midnight) and AMEC collects the module the following morning and transports it to ESL for PAH analysis. AMEC uses the field pressure measurements and laboratory results to calculate a concentration, which is reported in the monthly reports.

Evacuated Canisters

Air sampling for VOCs in air is performed with an evacuated canister. The sampler consists of a stainless steel canister, and a sampling tip with a flow restrictive orifice.

The unit works by drawing in air through the evacuation of the canister (under negative pressure) through the flow restrictive orifice filling the 1.7 litre canister over a 24 hour period. VOCs will be captured in the canister, where they are analyzed at Phillip Analytical Laboratories in Burlington, Ontario.

Figure A4

The main steps involved in sampling include the following:

1. VOC canister preparation by Phillip Analytical Laboratory.
2. Installing the VOC canister at the sampling location and attaching the flow restrictive tip.
3. Checking the initial pressure of the canister to ensure it is useable for sampling.
4. Manually opening the canister valve at midnight on the day of sampling to start the evacuation (sampling) process.
5. Manually closing the canister valve the following midnight (24 hours later) on the day sampling is complete in order to end the evacuation process.
6. Checking the final pressure in the canister to ensure that a complete sample was obtained.
7. AMEC collects the canister the following morning and ships it to PSC for VOC analysis. AMEC receives the laboratory results, which are converted to $\mu g/m^3$, and are then reported in the monthly reports.

APPENDIX B

Data Validation Report

amec

Memo

To	**Bill Chew**	File no	
From	**Marilyn Hoyt**	cc	**Peter Lund**
Date	**June 27, 2002**		

Subject **Muggah Creek Air Monitoring**
Draft Data Validation Report – May Sampling Events

INTRODUCTION

Data for the analyses of air samples collected during May 2002 in support of the Muggah Creek Remediation Project in Sydney, Nova Scotia have been reviewed. These samples were collected on May 2nd, 14th and 28th, 2002 at the program's established monitoring locations in Sydney, Nova Scotia. Samples included in this review are listed in Table 1.

Samples were collected in evacuated canisters for analyses for volatile organic compounds (VOCs) in accordance with U. S. EPA Method TO-14A; for polyaromatic hydrocarbons (PAHs) on glass fiber filters and polyurethane foam plugs (PUFs) in accordance with Method TO13A; and for metals on quartz and PTFE filters. Quartz filters were used to sample air for particulate matter with aerodynamic diameters of 10 microns and less (PM_{10}) and PTFE filters were used for particulate matter with diameters of 2.5 micron and smaller ($PM_{2.5}$). Philip Services Corporation (PSC) analytical laboratory in Burlington, Ontario conducted analyses for VOCs and Environmental Services Laboratory (ESL) of Sydney, Nova Scotia conducted analyses for PAHs, particulates (PM_{10} and $PM_{2.5}$) and metals.

Data validation was conducted based upon reported results for quality control/quality assurance measures and consistent with U.S. EPA guidance for data review and evaluation.

SUMMARY OF VALIDATION FINDINGS

Results for volatile organics, PAHs and metals have been validated. Quality assurance/quality control measures met or exceeded method requirements with exceptions as discussed in this report. These exceptions include the loss of two VOC samples due to field failure, a limited number of VOC sample analyses with reporting limits for some analytes above program objectives and qualifications to VOC results for various reasons. Naphthalene was qualified in a limited number of samples as a result of blank contamination. Data as qualified in the final validated set are appropriate for use in characterizing the quality of the airshed in Sydney, Nova Scotia during the monitoring events.

Qualifications to results are summarized below:

Volatile Organics

- Most volatiles detected were at concentrations less than one half the low calibration standard and are qualified as estimated (JC) since the linearity of the instrument response cannot be assumed.

- Results for dichloromethane (methylene chloride) have been qualified as non-detected with elevated reporting limits as a result of laboratory background for this common solvent (UB).

- Field duplicate samples were collected at DesBarres Street on May 2nd. The cantroller for the field duplicate set on May 28th, 2002 became blocked so that inadequate sample volumes were collected. The DesBarres Street samples were also analyzed by Environment Canada. 1,1,1-Trichloroethane differed significantly in the two canisters, but agreement between PSC and Environment Canada was acceptable for the analyses.

- The DesBarres Street duplicates from May 2nd, 2002 were pressurized prior to analysis. Reporting limits for some analytes did not meet program objectives as a result.

Validated data for VOC are presented in Tables 2 through 4. Table 5 presents data for the replicate analyses of field duplicate samples by PSC and Environment Canada.

PAH

Naphthalene in several samples from May 2nd, 2002 was qualified as a result of low contamination in the method blank. All other method criteria for precision and accuracy were met for the remaining PAH analyses. Validated data for PAHs are presented in Tables 6 through 8. Field duplicate results are presented in Table 9.

Metals

Results for metals are presented in Tables 10 through 12. The method blanks and one field blank for the PM_{10} samples contained trace levels of various metals; data were qualified accordingly.

REVIEW ELEMENTS

Data validation included a review and evaluation of the following elements:

1. Sampling records
2. Chain of Custody documentation
3. Holding times
4. Canister certification analyses (VOC samples)
5. Canister pressure after sampling and upon laboratory receipt (VOC samples)
6. Method blanks
7. Laboratory spike samples
8. Matrix spike samples
9. Sample duplicate analyses
10. Internal Standard recoveries (VOCs)
11. Surrogate recoveries (PAHs)
12. Field blanks

Only those areas where discrepancies or anomalous results were noted are discussed below. The attached data tables indicate specific samples affected by these instances.

SAMPLING RECORDS / CHAIN OF CUSTODY

Samples collected on May 28th, 2002 were identified with the–260503- sequence. Field activities were delayed from the 26th to the 28th after the sample labels had been prepared and these were not altered. The Chain of Custody did not document the actual sampling date. The ESL laboratory reports indicate a sampling date of May 26th, 2002 in accordance with the program's naming convention, but the PSC report for VOCs has the correct sampling date. Although field records document the sampling event, the discrepancy should be flagged when these data are presented to ensure that the association between sample identification and date is correct.

VOLATILE ORGANIC ANALYSES

Sampling Events

Method Blank and Canister Certification Analyses

Dichloromethane was detected in the method blanks and certification analyses at concentrations ranging up to 1.4 ppbv. U.S. EPA guidance followed for this review directs that data for common laboratory chemicals such as dichloromethane be qualified unless the analyte is detected at 10 times above the level in the associated blanks. Unless this is the case, sample analysis results are considered potentially attributable to the laboratory background and dichloromethane is reported as non-detected with reporting limits set at the concentrations actually detected during the analyses (UB). PSC flagged all dichloromethane results as potentially attributable to laboratory background. Dichloromethane in all samples has been qualified as non-detected (UB) with reporting limits set at the concentrations detected in the individual samples.

Chloromethane was also detected near the detection limit in one canister certification analysis. This compound had not been detected in the sample previously collected in the canister and was not detected in the associated sample. This result indicates the potential for trace level chloromethane detections as a background contaminant.

Matrix Spike Analysis

The matrix spikes prepared and analyzed with the field samples demonstrated recoveries within acceptance limits with the exception of trichlorobenzene and hexachlorobutadiene. Recoveries for these were 28% and 41% respectively for the May 2nd samples and 23% and 35% for the May 14 samples. The recovery of trichlorobenzene was 45% for the May 28 samples. Reporting limits for these compounds in samples associated with the low recoveries have been qualified as estimated with a potential low bias (UJM). Trichlorobenzene was detected in three samples from the May 14th set; results are already qualified as estimated since measurements were made below the low calibration standard. The low recovery of the spike confirms that these results are estimates.

Field Duplicates and Quality Control Analyses by Environment Canada

Field duplicate samples were collected at the DesBarres Street location on May 2nd, 2002. Results for detected analytes are presented in Table 5 with the calculated relative percent differences (RPDs). Precision criteria are not typically applied to measurements made below a factor of five times the reporting limit.

Results between PSC and Environment Canada agreed within 25% relative difference where both laboratories detected analytes. 1,1,1-Trichloroethane levels in the two canisters were, however, significantly different. Based on the agreement between PSC and Environment Canada, the difference must be attributable to field activities or contamination prior to analysis rather than laboratory variances. Environment Canada detected chloromethane and dichlorodifluoromethane in

one canister at concentrations slightly above PSC's reporting limit, but PSC did not report them. Based on the levels, this is not a significant variance.

Reporting Limits

The volumes collected for the field duplicate samples from DesBarres Street were smaller than intended, and the canisters were at too negative a pressure for direct analysis. Samples were pressurized prior to analysis, diluting the air sample and effectively raising the detection limits above program objectives for most analytes.

PAH ANALYSES

As noted in the summary section, naphthalene was detected at a low level (0.1 ug) for the method blank associated with the May 2nd, 2002 samples. Sample results within a factor of 10 were qualified as non-detected with the reporting limits set at the amount detected in the sample analysis.

All other quality assurance/quality control measures met or exceeded method requirements. Field duplicate samples were collected at the Frederick Street location on May 28th, 2002. Results, as provided in Table 9, demonstrated qualitative agreement and quantitative precision within 20% RPD.

METALS ANALYSES

Method Blanks

Method blanks for the analyses of quartz filters associated with samples collected May 2nd, 2002 contained nickel and sodium; the method blank for May 14 samples contained boron, nickel, silver, potassium and sulfur and the field blank contained antimony and sodium. The blank for May 28th samples contained iron and sodium. These metals were qualified when detected within a factor of 10 times the field or method blank concentration in the associated samples.

Field Duplicates

Field duplicates were collected from the Victoria Road (PM_{10}) and Intercolonial Street ($PM_{2.5}$) sites on May 2nd, 2002. Results, as included in Table 10, agreed qualitatively. The metals detected were the same in both quartz filters except for manganese, which was at the detection limit in one sample. No metals were detected on the PTFE filters. Levels of detected metals were too close to the reporting limits to make relative percent differences relevant.

Gravimetric Analysis

The PM_{10} particulate matter result for the Frederick Street site on May 28th, 2002 was significantly higher than other samples. AMEC requested that the laboratory review their records and visually inspect the remaining portion of the filter itself. The laboratory reported that the filter was visually dirty, and that the color of the particulate matter was different (brown) than the typical particulate collected during this program. Since this sample also had comparatively high metals, the laboratory had taken a second portion of the filter for analysis and had confirmed that the metals as reported were correct for the filter.

Table 1: Air Samples Collected in May, 2002
Muggah Creek Remediation Project
Sydney, Nova Scotia

	Location	Analysis	May 2, 2002	May 14, 2002	May 26, 2002
1	Victoria Road	VOC	366-V-33-L1-020502-JM-M54	390-V-33-L1-140502-JM-M35	411-V-33-L1-280502-JM-M17
		PAH	373-P-33-L1-020502-JM-5	396-P-33-L1-140502-JM-27	417-P-33-L1-280502-JM-21
		Metals, PM10	379-10-33-L1-020502-JM-Q01120	403-10-33-L1-140502-JM-Q0116	424-10-33-L1-280502-JM-Q01136
		Field dup.	382-10-33-L1 -020502-JM-Q01123B		
2	Frederick Street	VOC	367-V-33-L2-020502-JM-M16	391-V-33-L2-140502-JM-M46	412-V-33-L2-280502-JM-M29
		PAH	374-P-33-L2-020502-JM-21	397-P-33-L2-140502-JM-T	418-P-33-L2-280502-JM29
		Field dup.			423-P-33-L2 -280502-JM-TB
		Metals, PM10	380-10-33-L2-020502-JM-Q01121	404-10-33-L2-140502-JM-Q0117	425-10-33-L2-280502-JM-Q01137
3	Henry Street	VOC	368-V-33-L3-020502-JM-M02	392-V-33-L3-140502-JM-M31	Invalid Sample
		Field dup.			Invalid Sample
		PAH	375-P-33-L3-020502-JM-23	398-P-33-L3-140502-JM-24	419-P-33-L3-280502-JM-23
		Metals, PM2.5	383-25-33-L3-020502-JM-S3	407-25-33-L3-140502-JM-S3	427-25-33-L3-280502-JM-S3
4	Kings Road	VOC	369-V-33-L4-020502-JM-M39	393-V-33-L4-140502-JM-M12	414-V-33-L4-280502-JM-M01
		PAH	376-P-33-L4-020502-JM-24	399-P-33-L4-140502-JM-23	420-P-33-L4-280502-JM-27
		Metals, PM2.5	384-25-33-L4-020502-JM-S4	408-25-33-L4-140502-JM-S4	428-25-33-L4-280502-JM-S4
5	Intercolonial Street	VOC	370-V-33-L5-020502-JM-M47	394-V-33-L5-140502-JM-M28	415-V-33-L5-280502-JM-M07
		PAH	377-P-33-L5-020502-JM-G	400-P-33-L5-140502-JM-21	421-P-33-L5-280502-JM-24
		Metals, PM2.5	385-25-33-L5-020502-JM-S5	409-25-33-L5-140502-JM-S5	429-25-33-L5-280502-JM-S5
		Field Dup.	386-25-33-L5-020502-JM-B		430-25-33-L5-280502-JM-FBDB
6	DesBarres Street	VOC	371-V-33-L6-020502-JM-M53	395-V-33-L6-140502-JM-M04	416-V-33-L6-280502-JM-M21
		Field dup.	372-V-33-L6-020502-JM-M19B		
		PAH	378-P-33-L6-020502-JM-T	401-P-33-L6-140502-JM-29	422-P-33-L6-280502-JM-G
		Metals, PM10	381-10-33-L6-020502-JM-Q01109	405-10-33-L6-140502-JM-Q0118	426-10-33-L6-280502-JM-Q01138
	Field Blank	VOC			
		PAH		402-P-33-L3 -140502-JM-5A	
		Metals, PM10		406-10-33-L2 -140502-JM-Q0119A	
		Metals,PM2.5		410-25-33-L4-140502-JM-B1A	

Table 2: Validated Data for VOC in Air
May 2, 2002 Sampling Event
Muggah Creek Remediation
Program
Sydney, Nova Scotia

Component	Victoria Road 366-V-33-L1-020502-JM-M54 024998 02 02-May-2002	Frederick Street 367-V-33-L2-020502-JM-M16 024999 02 02-May-2002	Henry Street 368-V-33-L3-020502-JM-M02 025000 02 02-May-2002	Kings Road 369-V-33-L4-020502-JM-M39 025001 02 02-May-2002	Intercolonial Street 370-V-33-L5-020502-JM-M47 025002 02 02-May-2002	DesBarres Street 371-V-33-L6-020502-JM-M53 025003 02 02-May-2002	DesBarres Street **Field Duplicate** 372-V-33-L6-020502-JM-M19B 025004 02 02-May-2002
	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv
Dichlorodifluoromethane	0.20U	0.20U	0.20U	0.20U	0.20U	**0.81JC**	0.70U
Chloromethane	**0.66JC**	0.29U	0.29U	0.29U	0.29U	1.1U	1.0U
Halocarbon 114	0.17U	0.17U	0.17U	0.17U	0.17U	0.63U	0.60U
Vinyl Chloride	0.08U	0.08U	0.08U	0.08U	0.08U	0.30U	0.28U
Chloroethane	0.09U	0.09U	0.09U	0.09U	**0.24JC**	0.33U	0.32U
1,2-Dichloroethane	0.15U	0.15U	0.15U	0.15U	0.15U	0.56U	0.53U
Bromomethane	0.09U	0.09U	0.09U	0.09U	0.09U	0.33U	0.32U
Trichlorofluoromethane	**0.30JC**	0.14U	0.14U	0.14U	**0.27JC**	0.52U	0.49U
1,1-Dichloroethylene	0.19U	0.19U	0.19U	0.19U	0.19U	0.70U	0.67U
cis-1,2-dichloroethylene	0.14U	0.14U	0.14U	0.14U	0.14U	0.52U	0.49U
1,1-Dichloroethane	0.17U	0.17U	0.17U	0.17U	0.17U	0.63U	0.60U
1,2-Dichloropropane	0.15U	0.15U	0.15U	0.15U	0.15U	0.56U	0.53U
Dichloromethane	2.0UB	1.5UB	2.5UB	1.8UB	0.93UB	2.2UB	3.1UB
Chloroform	0.15U	0.15U	0.15U	0.15U	0.15U	0.56U	0.53U
1,1,2,2-Tetrachloroethane	0.22U	0.22U	0.22U	0.22U	0.22U	**0.81U**	0.77U
Halocarbon 113	0.14U	0.14U	0.14U	0.14U	0.14U	**1.3**	0.49U
1,1,1-Trichloroethane	0.14U	0.14U	**0.18JC**	**0.39JC**	0.14U	**15**	**5.0**
1,1,2-Trichloroethane	0.12U	0.12U	0.12U	0.12U	0.12U	0.44U	0.42U
Toluene	**1.6**	**1.2**	**1.7**	**0.82JC**	**1.1**	**0.78JC**	**0.98JC**
Benzene	**0.72JC**	**0.38JC**	**2.0**	**0.37JC**	**0.73JC**	**1.5**	**1.3**
cis-1,3-Dichloropropene	0.14U	0.14U	0.14U	0.14U	0.14U	0.52U	0.49U
trans-1,3-Dichloropropene	0.11U	0.11U	0.11U	0.11U	0.11U	0.41U	0.39U
Trichloroethylene	**0.34JC**	**0.17JC**	**0.60JC**	0.13U	**0.17JC**	0.48U	0.46U
Tetrachloroethylene	0.15U	0.15U	0.15U	0.15U	0.15U	0.56U	**1.1**
Carbon tetrachloride	0.15U	0.15U	0.15U	0.15U	0.15U	0.56U	0.53U
Ethylene Dibromide	0.15U	0.15U	0.15U	0.15U	0.15U	0.56U	0.53U
Ethylbenzene	**0.16JC**	**0.24JC**	**0.18JC**	0.15U	0.15U	0.56U	0.53U
M&P-Xylene	**0.57JC**	**1.1**	**0.64JC**	**0.49JC**	**0.32JC**	0.85U	0.81U
O-Xylene	**0.23JC**	**0.35JC**	**0.28JC**	0.19U	0.19U	0.70U	0.67U
1,3,5-Trimethylbenzene	0.26U	0.26U	0.26U	0.26U	0.26U	0.96U	0.91U
1,2,4-Trimethylbenzene	**0.38JC**	**0.48JC**	**0.41JC**	0.25U	0.25U	0.93U	0.88U
1,3-Dichlorobenzene	0.25U	0.25U	0.25U	0.25U	0.25U	0.93U	0.88U
1,4-Dichlorobenzene	0.29U	0.29U	0.29U	0.29U	0.29U	1.1U	1.0U
1,2-Dichlorobenzene	0.29U	0.29U	0.29U	0.29U	0.29U	1.1U	1.0U
1,2,4-Trichlorobenzene	0.16UJM	0.16UJM	0.16UJM	0.16UJM	0.16UJM	0.59UJM	0.56UJM
Hexachlorobutadiene	0.33UJM	0.33UJM	0.33UJM	0.33UJM	0.33UJM	1.2UJM	1.2UJM
Chlorobenzene	0.15U	0.15U	0.15U	0.15U	0.15U	0.56U	0.53U
Styrene	2.0U	2.0U	2.0U	2.0U	2.0U	7.4U	7.0U

U = Non-detected at stated limit

UB = Non-detected with elevated reporting limit as a result of background laboratory and/or canister contamination

JC = Estimated value, measured at less than 1/2 the low calibration standard

UJM = Non-detected with estimated reporting limit, matrix spike analysis indicates potential low bias

Table 3: Validated Data for VOC in Air
May 14, 2002 Sampling Event
Muggah Creek Remediation Program
Sydney, Nova Scotia

	Victoria Road 390-V-33-L1-140502-JM-M35 027994 02 14-May-2002	Frederick Street 391-V-33-L2-140502-JM-M46 027995 02 14-May-2002	Henry Street 392-V-33-L3-140502-JM-M31 027996 02 14-May-2002	Kings Road 393-V-33-L4-140502-JM-M12 027997 02 14-May-2002	Intercolonial Street 394-V-33-L5-140502-JM-M28 027998 02 14-May-2002	DesBarres Street 395-V-33-L6-145002-JM-M04 027999 02 14-May-2002
Component	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv
Dichlorodifluoromethane	**0.50JC,JP**	**0.25JC**	**0.45JC**	**0.36JC**	**0.50JC**	0.20U
Chloromethane	0.41U	0.29U	0.29U	0.29U	0.29U	0.29U
Halocarbon 114	0.24U	0.17U	0.17U	0.17U	0.17U	0.17U
Vinyl Chloride	0.11U	0.08U	0.08U	0.08U	0.08U	0.08U
Chloroethane	0.13U	0.09U	**0.19JC**	0.09U	0.09U	0.09U
1,2-Dichloroethane	0.21U	0.15U	0.15U	**0.21JC**	0.15U	0.15U
Bromomethane	0.13U	0.09U	0.09U	0.09U	0.09U	0.09U
Trichlorofluoromethane	**0.21JC,JP**	**0.24JC**	**0.27JC**	**0.27JC**	**0.26JC**	**0.21JC**
1,1-Dichloroethylene	0.27U	0.19U	0.19U	0.19U	0.19U	0.19U
cis-1,2-dichloroethylene	0.20U	0.14U	0.14U	0.14U	0.14U	0.14U
1,1-Dichloroethane	0.24U	0.17U	0.17U	0.17U	0.17U	0.17U
1,2-Dichloropropane	0.21U	0.15U	0.15U	0.15U	0.15U	0.15U
Dichloromethane	1.4UB	2.1UB	1.1UB	2.1UB	4.0UB	3.7UB
Chloroform	0.21U	0.15U	0.15U	0.15U	0.15U	0.15U
1,1,2,2-Tetrachloroethane	0.31U	0.22U	0.22U	0.22U	0.22U	0.22U
Halocarbon 113	0.20U	**0.20JC**	0.14U	0.14U	0.14U	0.14U
1,1,1-Trichloroethane	0.20U	0.14U	0.14U	0.14U	0.14U	0.14U
1,1,2-Trichloroethane	0.17U	0.12U	0.12U	0.12U	0.12U	0.12U
Toluene	**0.41JC,JP**	**0.38JC**	**0.23JC**	**0.33JC**	**0.37JC**	**0.38JC**
Benzene	**0.25JC,JP**	**0.20JC**	**0.29JC**	**0.26JC**	**0.41JC**	**1.2**
cis-1,3-Dichloropropene	0.20U	0.14U	0.14U	0.14U	0.14U	0.14U
trans-1,3-Dichloropropene	0.15U	0.11U	0.11U	0.11U	0.11U	0.11U
Trichloroethylene	0.18U	0.13U	**0.28JC**	0.13U	**0.19JC**	**0.16JC**
Tetrachloroethylene	0.21U	0.15U	0.15U	0.15U	0.15U	0.15U
Carbon tetrachloride	0.21U	0.15U	0.15U	0.15U	0.15U	0.15U
Ethylene Dibromide	0.21U	0.15U	0.15U	0.15U	0.15U	0.15U
Ethylbenzene	0.21U	0.15U	0.15U	0.15U	0.15U	0.15U
M&P-Xylene	0.32U	0.23U	0.23U	0.23U	0.23U	0.23U
O-Xylene	0.27U	0.19U	0.19U	0.19U	0.19U	0.19U
1,3,5-Trimethylbenzene	0.36U	0.26U	0.26U	0.26U	0.26U	0.26U
1,2,4-Trimethylbenzene	0.35U	0.25U	0.25U	0.25U	0.25U	0.25U
1,3-Dichlorobenzene	0.35U	0.25U	0.25U	0.25U	0.25U	0.25U
1,4-Dichlorobenzene	0.41U	0.29U	0.29U	0.29U	0.29U	0.29U
1,2-Dichlorobenzene	0.41U	0.29U	0.29U	0.29U	0.29U	0.29U
1,2,4-Trichlorobenzene	**0.36JC,JP**	**0.20JC**	**0.24JC**	0.16UJM	0.16UJM	0.16UJM
Hexachlorobutadiene	0.46UJM	0.33UJM	0.33UJM	0.33UJM	0.33UJM	0.33UJM
Chlorobenzene	0.21U	0.21U	0.21U	0.21U	0.21U	0.21U
Styrene	2.8U	2.8U	2.8U	2.8U	2.8U	2.8U

U = Non-detected at stated limit.

UP = Non-detected with elevated reporting limit as a result of background laboratory and/or canister contamination.

UJM = Non-detected with estimated reporting limit; matrix spike analysis indicates potential low bias.

JC = Estimated vlaue, measured at less than 1/2 the low calibration standard.

JP = Estimated value, pressure change during shipment indicates potential in-leakage of air.

Table 4: Validated Data for VOC in Air
May 28, 2002 Sampling Event
Muggah Creek Remediation Program
Sydney, Nova Scotia

	Victoria Road 411-V-33-L1-260502-JM-M17 031837 02 26-May-2002	Frederick Street 412-V-33-L2-260502-JM-M29 031838 02 26-May-2002	Kings Road 414-V-33-L4-260502-JM-M01 031839 02 26-May-2002	Intercolonial Street 415-V-33-L5-260502-JM-M07 031840 02 26-May-2002	DesBarres Street 416-V-33-L6-260502-JM-M21 031841 02 26-May-2002
Component	ppbv	ppbv	ppbv	ppbv	ppbv
Dichlorodifluoromethane	0.20U	0.20U	0.20U	0.20U	0.20U
Chloromethane	0.29U	0.29U	0.29U	0.29U	0.29U
Halocarbon 114	0.17U	0.17U	0.17U	0.17U	0.17U
Vinyl Chloride	0.08U	0.08U	0.08U	0.08U	0.08U
Chloroethane	0.09U	0.09U	0.09U	0.09U	0.09U
1,2-Dichloroethane	0.15U	0.15U	0.15U	0.15U	0.15U
Bromomethane	0.09U	0.09U	0.09U	0.09U	0.09U
Trichlorofluoromethane	**0.36JC**	**0.35JC**	**0.38JC**	**0.36JC**	**0.49JC,JS**
1,1-Dichloroethylene	0.19U	0.19U	0.19U	0.19U	0.19U
cis-1,2-dichloroethylene	0.14U	0.14U	0.14U	0.14U	0.14U
1,1-Dichloroethane	0.17U	0.17U	0.17U	0.17U	0.17U
1,2-Dichloropropane	0.15U	0.15U	0.15U	0.15U	0.15U
Dichloromethane	**3.4UB**	**4.9UB**	**5.3UB**	**6.9UB**	**3.1UB**
Chloroform	**0.15U**	0.15U	0.15U	0.15U	0.15U
1,1,2,2-Tetrachloroethane	0.22U	0.22U	0.22U	0.22U	0.22U
Halocarbon 113	0.14U	**0.26JC**	**0.15JC**	**0.25JC**	**0.22JC**
1,1,1-Trichloroethane	**0.24JC**	0.14U	0.14U	**0.28JC**	0.14U
1,1,2-Trichloroethane	0.12U	0.12U	0.12U	0.12U	0.12U
Toluene	**1.1**	**2.9**	**1.9**	**6.2JP**	**2.0**
Benzene	**0.35JC**	**0.47JC**	**0.47JC**	**0.89JC**	**0.38JC**
cis-1,3-Dichloropropene	0.14U	0.14U	0.14U	0.14U	0.14U
trans-1,3-Dichloropropene	0.11U	0.11U	0.11U	0.11U	0.11U
Trichloroethylene	**0.31JC**	**0.21JC**	**0.22JC**	**1.9JP**	**0.19JC**
Tetrachloroethylene	0.15U	0.15U	0.15U	0.15U	0.15U
Carbon tetrachloride	0.15U	0.15U	0.15U	0.15U	0.15U
Ethylene Dibromide	0.15U	0.15U	0.15U	0.15U	0.15U
Ethylbenzene	0.15U	**0.20JC**	0.15U	**0.46JC**	0.15U
M&P-Xylene	**0.38JC**	**0.58JC**	**0.40JC**	**1.2**	**0.50JC**
O-Xylene	0.19U	**0.23JC**	**0.20JC**	**0.42JC**	**0.22JC**
1,3,5-Trimethylbenzene	0.26U	0.26U	0.26U	0.26U	0.26U
1,2,4-Trimethylbenzene	**0.28JC**	0.25U	**0.35JC**	**0.52JC**	**0.32JC**
1,3-Dichlorobenzene	0.25U	0.25U	0.25U	0.25U	0.25U
1,4-Dichlorobenzene	0.29U	0.29U	0.29U	0.29U	0.29U
1,2-Dichlorobenzene	0.29U	0.29U	0.29U	0.29U	0.29U
1,2,4-Trichlorobenzene	0.16UJM	0.16UJM	0.16UJM	0.16UJM	0.16UJM
Hexachlorobutadiene	0.33U	0.33U	0.33U	0.33U	0.33U
Chlorobenzene	0.15U	0.15U	0.15U	0.15U	0.15U
Styrene	2.0U	2.0U	2.0U	2.0U	2.0U

U = Non-detected at stated limit

UB = Non-detected with elevated reporting limit as a result of background laboratory and/or canister contamination.

UJM = Non-detected with estimated reporting limit; matrix spike analysis indicates potential low bias.

JS = Estimated value as a result of low internal standard recovery.

JC = Estimated vlaue, measured at less than 1/2 the low calibration standard

Table 5: Field Duplicate Analyses for VOC in Air
Muggah Creek Remediation Program
Sydeny, Nova Scotia

Component	DesBarres Street 371-V-33-L6-020502-JM-M53 025003 02 02-May-2002	DesBarres Street Field Duplicate 372-V-33-L6-020502-JM-M19B 025004 02 02-May-2002	PSC RPD	Environment Canada KC M53	 KC M19	EC RPD	RPD EC/PSC KC M53	 KC M19
	ppbv	ppbv		ppbv	ppbv			
Dichlorodifluoromethane	**0.81**	<0.70		0.74	0.76	3%	9%	NC
Chloromethane	<1.1	<1.0		1.95	0.92	72%	NC	NA
Halocarbon 113	**1.3**	<0.49		1.06	0.44	83%	23%	NA
1,1,1-Trichloroethane	**15.00**	**5.00**	100%	15.99	5.85	93%	6%	16%
Toluene	**0.78**	**0.98**	23%	0.62	0.98	45%	23%	0%
Benzene	**1.50**	**1.30**	14%	1.66	1.48	11%	10%	13%
Tetrachloroethylene	<0.56	**1.1**		0.05	0.71	174%	NA	55%

NA = Not applicable; PSC detection limit was greater than the amount reported by Environment Canada.

NC = Not calculated; PSC detection limit was below amount reported by Environment Canada.

Table 6: Validated Data for PAH in Air
May 2, 2002 Sampling Event
Muggah Creek Remediation Program
Sydney, Nova Scotia

May 2, 2002	Victoria Road 373-P-33-L1-020502-JM-5 mg/filter	Frederick Street 374-P-33-L2-020502-JM-21 mg/filter	Henry Street 375-P-33-L3-020502-JM-23 mg/filter	Kings Road 376-P-33-L4-020502-JM-24 mg/filter	Intercolonial Street 377-P-33-L5-020502-JM-G mg/filter	DesBarres Street 378-P-33-L6-020502-JM-T mg/filter
Naphthalene-PUF	0.25UB	1	0.44UB	0.26UB	0.47UB	0.31UB
Acenaphthylene-PUF	0.16	0.13	0.33	0.12	0.2	0.16
Acenaphthene-PUF	0.1	0.28	0.13	0.07	0.44	0.1
Fluorene-PUF	0.57	0.88	1.1	0.35	1.2	0.67
Phenanthrene-PUF	2	2.2	5.8	1.1	3.2	3
Anthracene-PUF	0.16	0.14	1.1	0.09	0.28	0.35
Fluoranthene-PUF	0.39	0.44	2.1	0.19	0.55	0.65
Pyrene-PUF	0.33	0.23	2.3	0.17	0.5	0.66
Benzo(a)anthracene-PUF	<0.05U	<0.05U	0.36	<0.05U	0.05	0.1
Chrysene-PUF	0.06	<0.05U	0.57	<0.05U	0.09	0.15
Benzo Fluoranthene-PUF	0.08	<0.10U	0.72	<0.10U	0.13	0.22
Benzo(a) pyrene-PUF	<0.05U	<0.05U	0.28	<0.05U	<0.05U	0.06
Indeno (1,2,3-cd) pyrene-PUF	<0.05U	<0.05U	0.3	<0.05U	<0.05U	0.09
Dibenz(a,h,) anthracene-PUF	<0.05U	<0.05U	<0.05U	<0.05U	<0.05U	<0.05U
Benzo(g,h,i)perylene-PUF	<0.05U	<0.05U	0.33	<0.05U	0.06	0.08
Surrogate, % Recovery						
Acenaphthene-d10 - PUF	88	92	85	103	100	95
Phenanthrene-d10 - PUF	102	96	101	103	101	101
Chrysene-d12 - PUF	104	97	101	103	102	103

U = Non-detected at the stated limit.

UB = Non-detected with elevated reporting limit as a result of method blank contamination.

Table 7: Validated Data for PAH in Air
May 14, 2002 Sampling Event
Muggah Creek Remediation Program
Sydney, Nova Scotia

May 14, 2002	Victoria Road	Frederick Street	Henry Street	Kings Road	Intercolonial Street	DesBarres Street	Henry Street Field Blank
	396-P-33-L1-140502-JM-27	397-P-33-L2-140502-JM-T	398-P-33-L3-140502-JM-24	399-P-33-L4-140502-JM-23	400-P-33-L5-140502-JM-21	401-P-33-L6-140502-JM-29	402-P-33-L3-140502-JM-5A
	mg/filter	mg/filter	mg/filter	mg/filter	mg/filter	mg/filter	mg/filter
Naphthalene-PUF	0.18UB	0.15UB	0.16UB	0.24UB	0.34UB	0.19UB	< 0.05U
Acenaphthylene-PUF	0.09	0.05	0.23	0.25	0.10	0.13	< 0.05U
Acenaphthene-PUF	0.06	0.38	0.15	0.12	0.29	0.27	< 0.05U
Fluorene-PUF	0.59	0.66	0.55	0.64	0.91	0.81	< 0.05U
Phenanthrene-PUF	1.2	1.2	1.3	1.8	1.7	1.4	< 0.05U
Anthracene-PUF	0.10	0.09	0.16	0.20	0.14	0.13	< 0.05U
Fluoranthene-PUF	0.25	0.25	0.31	0.48	0.38	0.31	< 0.05U
Pyrene-PUF	0.17	0.13	0.30	0.42	0.20	0.20	< 0.05U
Benzo(a)anthracene-PUF	< 0.05U	< 0.05U	< 0.05U	0.06	< 0.05U	< 0.05U	< 0.05U
Chrysene-PUF	0.08	0.05	0.06	0.13	0.07	0.06	< 0.05U
Benzo Fluoranthene-PUF	0.11	< 0.10U	< 0.10U	0.17	< 0.10U	< 0.10U	< 0.10U
Benzo(a) pyrene-PUF	< 0.05U	< 0.05U	< 0.05U	< 0.05U	< 0.05U	< 0.05U	< 0.05U
Indeno (1,2,3-cd) pyrene-PUF	< 0.05U	< 0.05U	< 0.05U	0.06	< 0.05U	< 0.05U	< 0.05U
Dibenz(a,h,) anthracene-PUF	< 0.05U	< 0.05U	< 0.05U	< 0.05U	< 0.05U	< 0.05U	< 0.05U
Benzo(g,h,i)perylene-PUF	< 0.05U	< 0.05U	< 0.05U	0.08	< 0.05U	< 0.05U	< 0.05U
Surrogate, % Recovery							
Acenaphthene-d10 - PUF	86	71	84	101	90	[illegible]	98
Phenanthrene-d10 - PUF	91	87	91	106	96	94	103
Chrysene-d12 - PUF	96	93	92	106	99	98	104

U = Non-detected at the stated limit

UB = Non-detected with elevated reporting limit as a result of method blank contamination

Table 8: Validated Data for PAH in Air
May 26, 2002 Sampling Event
Muggah Creek Remediation Program
Sydney, Nova Scotia

May 28, 2002	Victoria Road	Frederick Street	Frederick Street Field Duplicate	Henry Street	Kings Road	Intercolonial Street	DesBarres Street
	417-P-33-L1-280502-JM-21	418-P-33-L2-280502-JM-29	423-P-33-L2-280502-JM-TB	419-P-33-L3-280502-JM-23	420-P-33-L4-280502-JM-27	421-P-33-L5-280502-JM-24	422-P-33-L6-280502-JM-G
	ug/sample	ug/sample	ug/sample	ug/sample	ug/sample	ug/sample	ug/sample
Naphthalene-PUF	1.7	0.30	0.32	0.56	0.55	1.2	0.95
Acenaphthylene-PUF	0.46	0.15	0.16	0.37	0.14	0.21	0.15
Acenaphthene-PUF	0.67	0.30	0.27	0.36	0.17	0.86	0.58
Fluorene-PUF	1.1	0.50	0.51	0.74	0.49	1.5	0.94
Phenanthrene-PUF	2.5	2.3	2.3	3.8	1.4	4.2	2.5
Anthracene-PUF	0.19	0.16	0.15	0.55	0.10	0.35	0.19
Fluoranthene-PUF	0.41	0.48	0.45	1.0	0.23	0.77	0.47
Pyrene-PUF	0.26	0.26	0.25	0.96	0.17	0.41	0.24
Benzo(a)anthracene-PUF	< 0.05U	< 0.05U	< 0.05U	0.14	< 0.05U	< 0.05U	< 0.05U
Chrysene-PUF	< 0.05U	0.06	0.05	0.22	< 0.05U	0.06	< 0.05U
Benzo Fluoranthene-PUF	< 0.1U	< 0.1U	< 0.1U	0.27	< 0.1U	< 0.1U	< 0.1U
Benzo(a) pyrene-PUF	< 0.05U	< 0.05U	< 0.05U	0.09	< 0.05U	< 0.05U	< 0.05U
Indeno (1,2,3-cd) pyrene-PUF	< 0.05U	< 0.05U	< 0.05U	0.11	< 0.05U	< 0.05U	< 0.05U
Dibenz(a,h,) anthracene-PUF	< 0.05U	< 0.05U	< 0.05U	< 0.05U	< 0.05U	< 0.05U	< 0.05U
Benzo(g,h,i)perylene-PUF	< 0.05U	< 0.05U	< 0.05U	0.13	< 0.05U	< 0.05U	< 0.05U
Surrogate, % Recovery							
Acenaphthene-d10 - PUF	96	83	78	88	93	91	101
Phenanthrene-d10 - PUF	103	87	85	99	99	100	103
Chrysene-d12 - PUF	98	92	87	95	102	97	102

U = Non-detected at the stated limit

[redacted] 9: [redacted] for [redacted] in [redacted]

May 2, 2002 Sampling Event
Muggah Creek Remediation Program
Sydney, Nova Scotia

May 2nd Metals	Quartz Blank	Victoria Road 379-10-33-L1-020502-JM-Q01120 mg/filter	Victoria Road Field Duplicate 382-10-33-L1-020502-JM-Q01123B mg/filter	Frederick Street 380-10-33-L2-020502-JM-Q01121 mg/filter	DesBarres Street 381-10-33-L6-020502-JM-Q01109 mg/filter
Aluminum - Filter	<0.2U	**0.4**	**0.3**	**0.5**	**0.2**
Antimony - Filter	<0.002U	<0.002U	<0.002U	<0.002U	<0.002U
Barium - Filter	<0.02U	<0.02U	<0.02U	<0.02U	<0.02U
Beryllium - Filter	<0.002U	<0.002U	<0.002U	<0.002U	<0.002U
Boron - Filter	<0.1U	<0.1U	<0.1U	<0.1U	<0.1U
Cadmium - Filter	<0.002U	<0.002U	<0.002U	<0.002U	<0.002U
Chromium - Filter	<0.002U	<0.002U	<0.002U	<0.002U	<0.002U
Cobalt - Filter	<0.002U	<0.002U	<0.002U	<0.002U	<0.002U
Calcium - Filter	<0.7U	<0.7U	<0.7U	<0.7U	<0.7U
Copper - Filter	<0.02U	**0.05**	**0.14**	**0.04**	**0.02**
Iron - Filter	<0.1U	**0.5**	**0.6**	**0.7**	**0.3**
Lead - Filter	<0.002U	**0.004**	**0.005**	**0.004**	**0.012**
Lithium - Filter	<0.002U	<0.002U	<0.002U	<0.002U	<0.002U
Manganese - Filter	<0.02U	<0.02U	**0.02**	**0.03**	<0.02U
Molybdenum - Filter	<0.02U	<0.02U	<0.02U	<0.02U	<0.02U
Nickel - Filter	**0.009**	<0.005U	<0.005U	<0.005U	<0.005U
Silver - Filter	<0.002U	<0.002U	<0.002U	<0.002U	<0.002U
Sodium - Filter	**1.3**	<0.6U	<0.6U	<0.6U	0.9UB
Thallium - Filter	<0.002U	<0.002U	<0.002U	<0.002U	<0.002U
Tin - Filter	<0.02U	<0.02U	<0.02U	<0.02U	<0.02U
Uranium - Filter	<0.002U	<0.002U	<0.002U	<0.002U	<0.002U
Vanadium - Filter	<0.002U	<0.002U	<0.002U	<0.002U	<0.002U
Zinc - Filter	<0.1U	<0.1U	<0.1U	<0.1U	<0.1U
Strontium - Filter	<0.005U	<0.005U	<0.005U	<0.005U	<0.005U
Magnesium - Filter	<0.2U	**0.2**	**0.3**	**0.3**	<0.2U
Potassium - Filter	<0.6U	<0.6U	<0.6U	<0.6U	<0.6U
Sulfur - Filter	<3.7U	<3.7U	<3.7U	<3.7U	<3.7U
Arsenic - Filter	<0.002U	<0.002U	<0.002U	<0.002U	**0.019**
Selenium - Filter	<0.002U	<0.002U	<0.002U	<0.002U	<0.002U
Mercury - Filter	<0.0001U	<0.0001U	<0.0001U	<0.0001U	<0.0001U
		PM10, mg/filter			
Particulates		20.4	21.6	17	14

U = Non-detected at the stated limit.
UB = Non-detected with elevated reporting limit as a result of method blank contamination.

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May 2, 2002 Sampling Event
Muggah Creek Remediation Program
Sydney, Nova Scotia

May 2nd Metals	PTFE Filter Blank mg/filter	Henry Street 383-25-33-L3-020502-JM-S3 mg/filter	Kings Road 384-25-33-L4-020502-JM-S4 mg/filter	Intercolonial Street 385-25-33-L5-020502-JM-S5 mg/filter	Intercolonial Street Field Duplilcate 386-25-33-L5-020502-JM-B1B mg/filter
Aluminum - Filter	<0.02U	<0.02U	<0.02U	<0.02U	<0.02U
Antimony - Filter	<0.0004U	<0.0004U	<0.0004U	<0.0004U	<0.0004U
Barium - Filter	<0.0004U	<0.0004U	<0.0004U	<0.0004U	<0.0004U
Beryllium - Filter	<0.0005U	<0.0005U	<0.0005U	<0.0005U	<0.0005U
Boron - Filter	<0.1U	<0.1U	<0.1U	<0.1U	<0.1U
Cadmium - Filter	<0.0003U	<0.0003U	<0.0003U	<0.0003U	<0.0003U
Chromium - Filter	<0.002U	<0.002U	<0.002U	<0.002U	<0.002U
Cobalt - Filter	<0.001U	<0.001U	<0.001U	<0.001U	<0.001U
Calcium - Filter	<0.1U	<0.1U	<0.1U	<0.1U	<0.1U
Copper - Filter	<0.002U	<0.002U	<0.002U	<0.002U	<0.002U
Iron - Filter	<0.1U	<0.1U	<0.1U	<0.1U	<0.1U
Lead - Filter	<0.001U	<0.001U	<0.001U	<0.001U	<0.001U
Lithium - Filter	<0.001U	<0.001U	<0.001U	<0.001U	<0.001U
Manganese - Filter	<0.001U	<0.001U	<0.001U	<0.001U	<0.001U
Molybdenum - Filter	<0.004U	<0.004U	<0.004U	<0.004U	<0.004U
Nickel - Filter	<0.003U	<0.003U	<0.003U	<0.003U	<0.003U
Silver - Filter	<0.002U	<0.002U	<0.002U	<0.002U	<0.002U
Sodium - Filter	<0.3U	<0.3U	<0.3U	<0.3U	<0.3U
Thallium - Filter	<0.0008U	<0.0008U	<0.0008U	<0.0008U	<0.0008U
Tin - Filter	<0.02U	<0.02U	<0.02U	<0.02U	<0.02U
Uranium - Filter	<0.00015U	<0.00015U	<0.00015U	<0.00015U	<0.00015U
Vanadium - Filter	<0.002U	<0.002U	<0.002U	<0.002U	<0.002U
Zinc - Filter	<0.002U	<0.002U	<0.002U	<0.002U	<0.002U
Strontium - Filter	<0.002U	<0.002U	<0.002U	<0.002U	<0.002U
Magnesium - Filter	<0.06U	<0.06U	<0.06U	<0.06U	<0.06U
Potassium - Filter	<0.6U	<0.6U	<0.6U	<0.6U	<0.6U
Sulfur - Filter	<3.7U	<3.7U	<3.7U	<3.7U	<3.7U
Arsenic - Filter	<0.0006U	<0.0006U	<0.0006U	<0.0006U	<0.0006U
Selenium - Filter	<0.001U	<0.001U	<0.001U	<0.001U	<0.001U
Mercury - Filter	<0.0001U	<0.0001U	<0.0001U	<0.0001U	<0.0001U
		PM2.5, mg/filter			
Particulates		<0.5U	<0.5U	<0.5U	<0.5U

U = Non-detected at the stated limit.
UB = Non-detected with elevated reporting limit as a result of method blank contamination.

Table 10: Validated Data for Metals in Air
May 14, 2002 Sampling Event
Muggah Creek Remediation Program
Sydney, Nova Scotia

May 14th Metals	Quartz Filter Blank	Victoria Road 403-10-33-L1-140502-JM-Q01116 mg/filter	Frederick Street 404-10-33-L2-140502-JM-Q01117 mg/filter	DesBarres Street 405-10-33-L6-140502-JM-Q01118 mg/filter	Frederick Street Field Blank 406-10-33-L2-140502-JM-Q01119A mg/filter
Aluminum - Filter	<0.2U	**0.6**	<0.2U	**0.3**	<0.2U
Antimony - Filter	<0.002U	<0.002U	<0.002U	<0.002U	**0.004**
Barium - Filter	<0.02U	<0.02U	<0.02U	<0.02U	<0.02U
Beryllium - Filter	<0.002U	<0.002U	<0.002U	<0.002U	<0.002U
Boron - Filter	**1.8**	< 0.1U	< 0.1U	< 0.1U	< 0.1U
Cadmium - Filter	<0.002U	<0.002U	<0.002U	<0.002U	<0.002U
Chromium - Filter	<0.002U	<0.002U	<0.002U	<0.002U	<0.002U
Cobalt - Filter	<0.002U	<0.002U	<0.002U	<0.002U	<0.002U
Calcium - Filter	<0.7U	**0.8**	<0.7U	**1.3**	<0.7U
Copper - Filter	<0.02U	**0.06**	**0.02**	**0.06**	< 0.02
Iron - Filter	<0.1U	**1**	**0.3**	**0.6**	< 0.1
Lead - Filter	<0.002U	**0.004**	**0.004**	**0.009**	<0.002U
Lithium - Filter	<0.002U	<0.002U	<0.002U	<0.002U	<0.002U
Manganese - Filter	<0.02U	**0.04**	<0.02U	<0.02U	<0.02U
Molybdenum - Filter	<0.02U	<0.02U	<0.02U	<0.02U	<0.02U
Nickel - Filter	**0.006**	< 0.005U	< 0.005U	< 0.005U	< 0.005U
Silver - Filter	**0.003**	< 0.002U	< 0.002U	< 0.002U	< 0.002U
Sodium - Filter	<0.6U	2.5UB	2UB	2.5UB	**0.8**
Thallium - Filter	<0.002U	<0.002U	<0.002U	<0.002U	<0.002U
Tin - Filter	<0.02U	<0.02U	<0.02U	<0.02U	<0.02U
Uranium - Filter	<0.002U	<0.002U	<0.002U	<0.002U	<0.002U
Vanadium - Filter	<0.002U	<0.002U	<0.002U	<0.002U	<0.002U
Zinc - Filter	<0.1U	<0.1U	<0.1U	<0.1U	<0.1U
Strontium - Filter	<0.005U	<0.005U	<0.005U	<0.005U	<0.005U
Magnesium - Filter	<0.2U	**0.5**	**0.2**	**0.4**	< 0.2U
Potassium - Filter	**1.3**	1 UB	0.9 UB	0.8UB	< 0.6U
Sulfur - Filter	**4.4**	< 3.7U	< 3.7U	< 3.7U	< 3.7U
Arsenic - Filter	<0.002U	**0.005**	**0.007**	**0.005**	< 0.002
Selenium - Filter	<0.002U	<0.002U	<0.002U	<0.002U	<0.002U
Mercury - Filter	< 0.0001U	< 0.0001U	< 0.0001U	< 0.0001U	< 0.0001U
		PM10, mg/filter			
Particulates		10.5	23.4	18	< 0.5U

U = Non-detected at the stated limit.
UB = Non-detetected with elevated reporting limit as a result of method and/or field blank contamination.

Table 10: Validated Data for Metals in Air
May 14, 2002 Sampling Event
Muggah Creek Remediation Program
Sydney, Nova Scotia

May 14th Metals	PTFE Filter Blank	Henry Street 407-25-33-L3-140502-JM-S3 mg/filter	Kings Road 408-25-33-L4-140502-JM-S4 mg/filter	Intercolonial Street 409-25-33-L5-140502-JM-S5 mg/filter	Kings Road Field Blank 410-25-33-L4-140502-JM-1A mg/filter
Aluminum - Filter	<0.02U	<0.02U	<0.02U	<0.02U	<0.02U
Antimony - Filter	<0.0004U	<0.0004U	<0.0004U	<0.0004U	<0.0004U
Barium - Filter	<0.0004U	<0.0004U	<0.0004U	<0.0004U	<0.0004U
Beryllium - Filter	<0.0005U	<0.0005U	<0.0005U	<0.0005U	<0.0005U
Boron - Filter	<0.1U	<0.1U	<0.1U	<0.1U	<0.1U
Cadmium - Filter	<0.0003U	<0.0003U	<0.0003U	<0.0003U	<0.0003U
Chromium - Filter	<0.002U	<0.002U	<0.002U	<0.002U	<0.002U
Cobalt - Filter	<0.001U	<0.001U	<0.001U	<0.001U	<0.001U
Calcium - Filter	<0.1U	<0.1U	<0.1U	<0.1U	<0.1U
Copper - Filter	<0.002U	<0.002U	<0.002U	<0.002U	<0.002U
Iron - Filter	<0.1U	<0.1U	<0.1U	<0.1U	<0.1U
Lead - Filter	<0.001U	<0.001U	<0.001U	<0.001U	<0.001U
Lithium - Filter	<0.001U	<0.001U	<0.001U	<0.001U	<0.001U
Manganese - Filter	<0.001U	<0.001U	<0.001U	<0.001U	<0.001U
Molybdenum - Filter	<0.004U	<0.004U	<0.004U	<0.004U	<0.004U
Nickel - Filter	<0.003U	<0.003U	<0.003U	<0.003U	<0.003U
Silver - Filter	<0.002U	<0.002U	<0.002U	<0.002U	<0.002U
Sodium - Filter	<0.3U	<0.3U	<0.3U	<0.3U	<0.3U
Thallium - Filter	<0.0008U	<0.0008U	<0.0008U	<0.0008U	<0.0008U
Tin - Filter	<0.02U	<0.02U	<0.02U	<0.02U	<0.02U
Uranium - Filter	<0.00015U	<0.00015U	<0.00015U	<0.00015U	<0.00015U
Vanadium - Filter	<0.002U	<0.002U	<0.002U	<0.002U	<0.002U
Zinc - Filter	<0.002U	<0.002U	<0.002U	<0.002U	<0.002U
Strontium - Filter	<0.002U	<0.002U	<0.002U	<0.002U	<0.002U
Magnesium - Filter	<0.06U	<0.06U	<0.06U	<0.06U	<0.06U
Potassium - Filter	<0.6U	<0.6U	<0.6U	<0.6U	<0.6U
Sulfur - Filter	<3.7U	<3.7U	<3.7U	<3.7U	<3.7U
Arsenic - Filter	<0.0006U	<0.0006U	<0.0006U	<0.0006U	<0.0006U
Selenium - Filter	<0.001U	<0.001U	<0.001U	<0.001U	<0.001U
Mercury - Filter	< 0.0001U	< 0.0001U	< 0.0001U	< 0.0001U	< 0.0001U
		PM2.5, mg/filter			
Particulates		<0.5U	<0.5U	< 0.5U	< 0.5U

U = Non-detected at the stated limit.
UB = Non-detetected with elevated reporting limit as a result of method and/or field blank contamination.

Table 11: Validated Data for Metals in Air
May 26, 2002 Sampling Event
Muggah Creek Remediation Program
Sydney, Nova Scotia

May 26th Metals	Quartz Filter Blank	Victoria Road 424-10-33-L1-260502-JM-Q01136 mg/filter	Frederick Street 425-10-33-L2-260502-JM-Q01137 mg/filter	DesBarres Street 426-10-33-L6-260502-JM-Q01138 mg/filter
Aluminum - Filter	<0.2U	**0.2**	**4.8**	<0.2U
Antimony - Filter	<0.002U	<0.002U	<0.002U	<0.002U
Barium - Filter	<0.02U	<0.02U	**0.04**	<0.02U
Beryllium - Filter	<0.002U	<0.002U	<0.002U	<0.002U
Boron - Filter	<0.1U	<0.1U	<0.1U	<0.1U
Cadmium - Filter	<0.002U	<0.002U	<0.002U	<0.002U
Chromium - Filter	<0.002U	<0.002U	**0.007**	<0.002U
Cobalt - Filter	<0 002U	<0.002U	**0.004**	<0.002U
Calcium - Filter	<0.7U	**1.1**	**2.9**	**1.8**
Copper - Filter	<0.02U	**0.05**	**0.05**	**0.1**
Iron - Filter	**0.2**	0.6UB	**8.2**	0.6UB
Lead - Filter	<0.002U	**0.009**	**0.016**	**0.004**
Lithium - Filter	<0.002U	<0.002U	**0.007**	<0.002U
Manganese - Filter	<0.02U	**0.02**	**0.4**	**0.04**
Molybdenum - Filter	<0.02U	<0.02U	<0.02U	<0.02U
Nickel - Filter	<0.005U	<0.005U	<0.005U	<0.005U
Silver - Filter	<0.002U	<0.002U	<0.002U	<0.002U
Sodium - Filter	**1.4**	<0.6U	0.7UB	<0.6U
Thallium - Filter	<0.002U	<0.002U	<0.002U	<0.002U
Tin - Filter	<0.02U	<0.02U	<0.02U	<0.02U
Uranium - Filter	<0.002U	<0.002U	<0.002U	<0.002U
Vanadium - Filter	<0.002U	**0.002**	**0.016**	**0.003**
Zinc - Filter	<0.1U	<0.1U	<0.1U	<0.1U
Strontium - Filter	<0.005U	<0.005U	<0.005U	<0.005U
Magnesium - Filter	<0.2U	**0.3**	**3.4**	**0.3**
Potassium - Filter	<0.6U	<0.6U	**0.6**	<0.6U
Sulfur - Filter	<3.7U	<3.7U	<3.7U	<3.7U
Arsenic - Filter	<0.002U	<0.002U	<0.002U	<0.002U
Selenium - Filter	<0.002U	<0.002U	<0.002U	<0.002U
Mercury - Filter	<0.0001U	<0.0001U	<0.0001U	<0.0001U
			PM10, mg/filter	
Particulate		23.3	275	31

U = Non-detected at the stated limit
UB = Non-detected with elevated reporting limit as a result of method blank contamination

Table 11: Validated Data for Metals in Air
May 26, 2002 Sampling Event
Muggah Creek Remediation Program
Sydney, Nova Scotia

May 26th Metals	PTFE Filter Blank	Henry Street 427-25-33-L3-260502-JM-S3 mg/filter	Kings Road 428-25-33-L4-260502-JM-S4 mg/filter	Intercolonial Street 429-25-33-L5-260502-JM-S5 mg/filter	Intercolonial Street Field Duplicate 430-25-33-L5-260502-JM-FBDB mg/filter
Aluminum - Filter	<0.02U	<0.02U	<0.02U	**0.07**	<0.02U
Antimony - Filter	<0.0004U	<0.0004U	<0.0004U	<0.0004U	<0.0004U
Barium - Filter	<0.0004U	<0.0004U	<0.0004U	<0.0004U	<0.0004U
Beryllium - Filter	<0.0005U	<0.0005U	<0.0005U	<0.0005U	<0.0005U
Boron - Filter	<0.1U	<0.1U	<0.1U	<0.1U	<0.1U
Cadmium - Filter	<0.0003U	<0.0003U	<0.0003U	<0.0003U	<0.0003U
Chromium - Filter	<0.002U	<0.002U	<0.002U	<0.002U	<0.002U
Cobalt - Filter	<0.001U	<0.001U	<0.001U	<0.001U	<0.001U
Calcium - Filter	<0.1U	<0.1U	<0.1U	<0.1U	<0.1U
Copper - Filter	<0.002U	<0.002U	<0.002U	<0.002U	**0.003**
Iron - Filter	<0.1U	<0.1U	<0.1U	<0.1U	<0.1U
Lead - Filter	<0.001U	<0.001U	<0.001U	<0.001U	<0.001U
Lithium - Filter	<0.001U	<0.001U	<0.001U	<0.001U	<0.001U
Manganese - Filter	<0.001U	<0.001U	<0.001U	<0.001U	<0.001U
Molybdenum - Filter	<0.004U	<0.004U	<0.004U	<0.004U	<0.004U
Nickel - Filter	<0.003U	<0.003U	<0.003U	<0.003U	<0.003U
Silver - Filter	<0.002U	<0.002U	<0.002U	<0.002U	<0.002U
Sodium - Filter	<0.3U	<0.3U	<0.3U	<0.3U	<0.3U
Thallium - Filter	<0.0008U	<0.0008U	<0.0008U	<0.0008U	<0.0008U
Tin - Filter	<0.02U	<0.02U	<0.02U	<0.02U	<0.02U
Uranium - Filter	<0.00015U	<0.00015U	<0.00015U	<0.00015U	<0.00015U
Vanadium - Filter	<0.002U	<0.002U	<0.002U	<0.002U	<0.002U
Zinc - Filter	<0.002U	<0.002U	<0.002U	<0.002U	<0.002U
Strontium - Filter	<0.002U	<0.002U	<0.002U	<0.002U	<0.002U
Magnesium - Filter	<0.06U	<0.06U	<0.06U	<0.06U	<0.06U
Potassium - Filter	<0.6U	<0.6U	<0.6U	<0.6U	<0.6U
Sulfur - Filter	<3.7U	<3.7U	<3.7U	<3.7U	<3.7U
Arsenic - Filter	<0.0006U	<0.0006U	<0.0006U	<0.0006U	<0.0006U
Selenium - Filter	<0.001U	<0.001U	<0.001U	<0.001U	<0.001U
Mercury - Filter	<0.0001U	<0.0001U	<0.0001U	<0.0001U	<0.0001U
		PM2.5, mg/filter			
Particulate		<0.5U	<0.5U	<0.5U	<0.5U

APPENDIX C

Environment Canada VOC Duplicate Results

May 02, 2002 Collocated Samples

Field Sample ID	Canister ID
371-V-33-L6-020502-JM-M53	KC-M53
372-V-33-L6-020502-JM-M19B	KC-M19

All values in ug / m3	18-Sep-01				ug/m3 to		
	MDL	Meth Blank	KC-M53	KC-M19	ppbv	KC-M53	KC-M19
Freon 12 (Dichlorodifluorometha	0.026	<	2.61	2.67	0.283	0.73709	0.755244
Chloromethane	0.021	0.017	4.02	1.90	0.484	1.945282	0.920066
Chloroethane	0.016	<	0.49	0.31	0.379	0.186786	0.118059
Freon 11 (Trichlorofluoromethan	0.017	<	1.63	1.72	0.178	0.290633	0.30545
Dichloromethane	0.023	0.021	1.52	2.27	0.288	0.437576	0.654639
Freon 113 (1,1,2-Trichlorotrifluo	0.032	<	8.15	3.39	0.130	1.063562	0.442232
1,1,1-Trichloroethane	0.019	<	87.26	31.91	0.183	15.99348	5.849476
Benzene	0.029	0.015	4.94	4.73	0.313	1.54778	1.479673
Trichloroethylene	0.024	<	1.50	3.51	0.186	0.278521	0.653291
Toluene	0.024	<	2.34	3.69	0.265	0.621517	0.979405
Tetrachloroethene	0.018	<	0.34	4.80	0.147	0.05008	0.707555
m,p-Xylene	0.029	<	0.80	1.62	0.230	0.185084	0.37289
1,2,4-Trimethylbenzene	0.022	<	0.46	1.30	0.203	0.092656	0.263798
1,3-Dichlorobenzene	0.014	<	0.03	0.14	0.166	0.004246	0.023635

Sample date		02-May-02	02-May-02
Date of Receipt		10-May-02	10-May-02
Analysis Date	13-May-02	13-May-02	13-May-02
Initial Pressure / Vacuum		9.5 psig	8.2 psig
Valve Type		PGI	PGI
Lab File Name	BL249B.D	SYD013.D	SYD014.D

< = Less Than Method Detection Limit

note : no "correction" of sample data for negligible VOC levels in sample dilution air